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WIDE AWAKE

VOLUME BB



BOSTON
D. LOTHROP COMPANY

WASHINGTON STREET OPPOSITE BROMFIELD



MASTER ALLEN'S PROPHECY.

(Cooking in the Public Schools.)



TWENTY-FIVE years ago, Master Allen, the head of the Hancock School in Boston, said contemptuously: "Teach sewing in the public schools! The next thing we know they will be for setting up cook-stoves in our school-rooms, and asking us to teach the girls to make bread and broil beefsteak!"

To Master Allen's mind that was the very height of impossibility; the very remotest contingency; and in making the remark he felt that he was giving full expression to the fine scorn with which he regarded the innovation of needle and thimble.

And yet, what he considered as impossible has come about. What do you suppose Master Allen would say could he take a peep now, during any school day, into the finely-appointed kitchen in the basement of the Tennyson Street Schoolhouse in Boston, and see the interested girls in white caps and aprons, learning how to become good housekeepers and cooks? He would be utterly bewildered with it all; and unless he has grown much wiser in his new environment, he would think, no doubt, that a backward step had been taken in the modes of education.

But people have had time and opportunity to learn many things since the stubborn principal of the large North End School held such despotic sway; and among the things that have

been learned is a lesson that it has taken much time to impress upon the minds of those who have had the public schools and their management in charge.

It was this: that the education being given to the children was a very one-sided one, and that while it gave a great deal of information that might, or might not, be of value to those who obtained it, there was a decided lack of practical instruction, so that when the boys and girls left the schools, they had absolutely no working capital.

The few people who first felt this truth, and dared to speak about it, and to suggest that there should be some change in the plan of instruction, were laughed at as "silly folk" who must find fault with something. The word "crank" had not then taken its place in the current vocabulary; but you know nowadays it is shouted derisively after every one who dares to advance an opinion that differs from the one held by the majority. That is what the early advocates of industrial education would have been called had the word then existed with its present significance.

But all the scorn that was heaped upon the advocates of the new education, and all the ridicule, could not make them believe themselves anything but right; and by degrees they drew other people to their own way of thinking, until, before the great public knew anything about it, there was a large number of persons, including the wisest men and women of the time, protesting against this one-sided instruction, which trained the head at the expense of the hands. What these far-sighted people believed in, was a school-system that would provide an "all round" education.

The first result of the agitation was the introduction of sewing into the public schools, as a two-hours exercise each week. There were a great many protestants against the innovation beside Master Allen; but the reason his protest is specially remembered is on account of the prophecy which it contained. No doubt he would have been as unwilling a prophet as he was an unconscious one, but a prophet he was notwithstanding.

Well, the sewing was introduced, and it did not overturn the schools, nor demoralize the pupils. But the sharp little needles, in the hands of the willing girls, went on pricking individual prejudices, until by and by the very people who had opposed it, were its warm friends and advocates. The teachers said that the children worked better at their books for the change of employment; that the heads rested while the hands worked, and that a deal of dangerous nervous restlessness was carried off through the stitches. Mothers were proud of the work their girls could do, and the girls themselves grew particular about the appearance of their clothing, taking better care of it, since they knew the labor of making, and had learned the knack of repairing.

It is no wonder when the experiment of sewing was found to be a success, that the people who had been instrumental in bringing it about, should look around for another department of industry to introduce. But it is a wonder that it was going to be as necessary to convert the public to the new work, as it had been to the sewing.

But a wise woman who has proven her wisdom in many ways in forwarding education, and helping boys and girls to become useful men and women, decided that it was better to prove the usefulness of the measure first, then, should it be necessary, to argue about it afterwards. Mrs. Mary Hemenway, who had supported the Old South Free Lectures for the children of the public schools, who had founded schools for the poor children in the South, who had offered and bestowed the prizes for the essays in American History to be written by the graduates of the High Schools, had also for a number of years supported a summer school in the Tennyson Street Schoolhouse, where girls have been

taught several branches of industry, including even light carpentering and cabinet-making. After watching her experiments for several seasons, Mrs. Hemenway decided that the best industry to introduce into the public schools would be cooking. She did not talk much about her plan; she asked the School Committee to let her keep the kitchen she had so beautifully fitted up, and to allow classes of girls from several of the schools to be sent during the year for instruction in cooking, which she would provide at her own expense.

It may be that the School Committee were rather anxious to have such an experiment tried. At any event, they gave Mrs. Hemenway ready permission to keep the kitchen, and heartily accepted the very generous proposition that she made them.

So the school was begun, and there were two classes of fifteen girls each, that met every day to learn the mysteries of cooking. Each girl who came to the school took only one half a day each week from her book-studies; and no girl was allowed to attend whose mother did not fully approve of her doing so.

The pupils were marked for tardiness or for absence, exactly as they were at the school itself; for the cooking, like the sewing, was considered a part of the school-training, and a regular school-exercise, at which the girls were still held under the rules.

At first the pupils themselves didn't quite know whether to like the new departure or not. It was something so new, so utterly out of the every day school routine. But as most girls have the natural instinct of the housewife, that waits only occasion to arouse, they soon found that the new duty was very pleasant.

In the first place, they had such a perfectly appointed kitchen to work in! It was a real delight to be in it, and to be allowed to handle all the convenient implements at will, with the feeling of absolute proprietorship. There were closets and cupboards filled with stores, and with pretty dishes; a large range, always kept bright and shining, and that looked cheerful from very cleanliness, even when there was no fire in it; an abundance of towels and dish-cloths, and, best of all, a large circular table, divided into compartments, each one having its

own gas stove, its spoons, its mixing dishes and measuring cups, its bread-board and rolling-pin, its egg-beaters and strainers—all the conveniences, indeed, that could be needed for personal use in cooking. Each girl had her cap and apron, usually a long tier with sleeves, that covered her from the throat of her dress to the hem, protecting it from all traces of the work in which she was engaged. With her apron and cap, her holder and towel pinned to her side, she was ready to begin her work, and, as a general thing, every one of the pupils felt a real enthusiasm after the first strangeness was over.

For three years Mrs. Hemenway has continued her experiment; now the city has taken it, and has established other schools as well in different parts of the city, so that during the present year eighteen hundred girls have received good training in cooking. There has been no need for argument; the experiment has been proof as Mrs. Hemenway was sure it would be, and everybody is praising the cooking as they have before praised the sewing.

But the best of it all is to hear the mothers talk about it; they are so delighted with the results that they have nothing but thankfulness toward the system. You see the girls do not merely learn their lessons in theory, but they really do the work themselves, and then go home and cook the same dishes for the family meals, so that the mothers and fathers have an opportunity of testing for themselves the value of the teaching. And they are very proud when they can treat some visitor to a specially nice dish and say, "It was made by daughter; she learned it at school."

A mother said to me, not long since, while telling about some trouble she had had with a servant, which resulted in her sending the girl away:

"Annie"—that was her daughter who had graduated from the grammar school a little less than a year before—"says I shall not be bothered with another servant; she is going to do the family cooking. And oh! it is such a comfort and rest to have her do it. She is so economical, and so nice about it, and she really enjoys it herself so much! I would much rather she did this than went out of her home to work, as she would. So I have told her that I would

pay her just what I had been paying a girl. She will have her own income, and we will have good cooking and nice housekeeping. I feel the relief already."

Wasn't that a jolly, comfortable way of fixing things? And wouldn't many a girl like it, if she could be the mother's helper in such a fashion? And that is just what the cooking-schools are making possible, both for mothers and daughters; and between you and me, I think it is going some way in solving the perplexing question of domestic service and inefficient help, that we all hear so much about in these days. There is a chance for a good long look ahead in this subject, and one day you and I will look back over the ground that has been trodden, and wonder that the public teaching of cookery wasn't thought about earlier.

In the schools now, whenever there is a sewing exhibition, there is a cooking exhibition as well; and after the visitors have admired the nicely made under-clothing, bed and table linen, and wondered at the skill and proficiency which made it possible for such young needlewomen to compass the dresses, complete infants' wardrobes, and boys' suits, that are spread out for them to see, each with the name and age of the youthful seamstress pinned to it, they are asked to another room. And there they are shown fine loaves of bread, nicely cooked meats, fish and vegetables, gruels and beef tea, jellies and blanc-manges, that are also labelled with the name and age of the makers. You will not find many loaves of cake, or pies, or much "fancy cooking," for the school teaches the common-sense of cookery; believing if the pupils learn the principles thoroughly they can do very much themselves with practice.

Now as there are so many of you who do not belong in the Boston schools, and who have not the opportunity of learning what is taught to the fortunate girls who do, WIDE AWAKE is going to tell you a little bit of what these girls really learn, trusting that it may interest you so much that you will all become earnest advocates of a system of education that shall embrace some of the industries, and shall place value on the work of the hands as well as of the head.

Because you are not where you have the advantage of the training of these schools, you

need not think it is of no use for you to want it. By no means. Other cities and towns are following the example of Boston, and are introducing the teaching of cooking into their public schools; and if you are really in earnest in your desire, you may impart your interest to others, and out of the growth of this interest may come the very thing you want. Public-spirited girls have a chance to make a great many advance steps in any good movement. There is no telling what they may bring about by talking with their parents over the morning coffee.

There are teachers in training now to take positions in schools as teachers of cookery, and those already graduated have found places in

New England cities, and in the South and West. One young colored woman came from the Tuskegee College in Alabama to prepare herself to take the department of cooking in that institution, and she has finished her course and gone to her work full of enthusiasm for it.

In most of the cities the school is supported from the school-fund, a special appropriation being made for it; in other places it is carried on by private generosity. Mr. Augustus Hemenway, the son of Mrs. Hemenway who began the work in Boston, has followed his mother's example and has established a school in Canton, the town in which he lives, and still another in Easton.

Sallie Joy White.

A STEAMBOAT WITHOUT STEAM.

(A Bit of Winter-time Carpentry.)

MANY boys try to build a steamboat with a model engine or clockwork, but the apparatus generally gets out of order or refuses to work when wet. I propose to tell how to make a boat which will always go, never get out of order, and will require neither engine nor clockwork, but simply a stiff spring of whalebone or steel.

First make the hull — the size of which depends of course on the length of the spring. For one

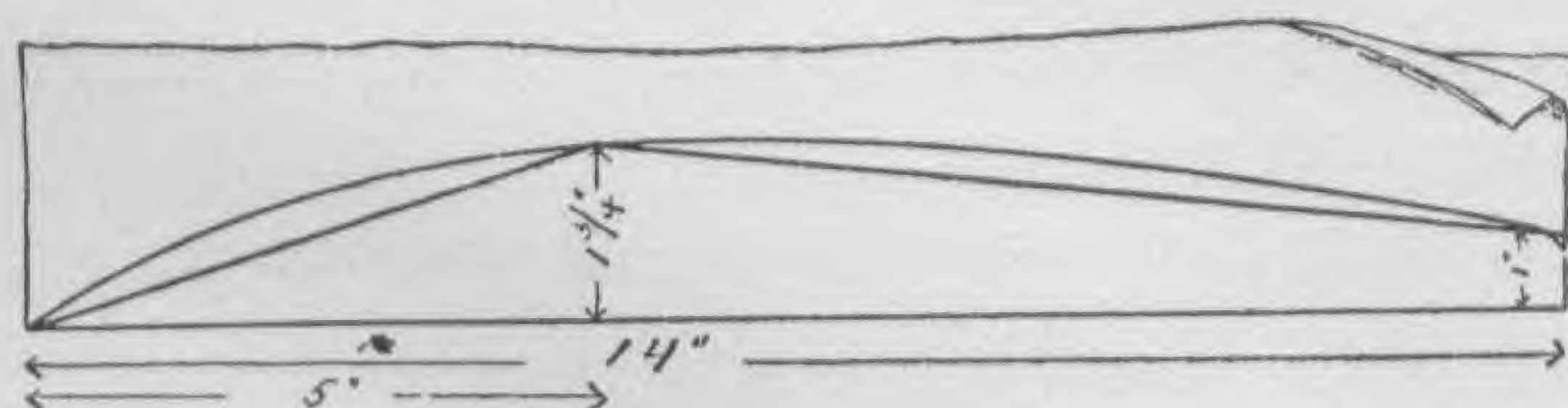


Fig. 1.

of ten or twelve inches, make the boat fourteen inches long, three and one half broad. Take a piece of stiff paper, fold it double, mark off the length of the boat along the folded edge. Five inches from the bow, measure one and three fourths inches at right angles to the folded edge, and make a dot there. At the stern make a

second dot one inch from the fold. Draw straight lines from the second dot to the first, and from the first to the bow.

Next, with the scissors cut a curve from the bow through the dots. The straight lines act as a guide and show you when the curve is even. Round off the curve at the stern (all this is shown in *Fig. 1*) and open the paper.

Place this pattern on a piece of inch board of the necessary size, and pin it open, being careful to drive two pins through the line where the paper was folded. Make a pencil mark around the pattern. Take it off and draw a straight line through the pin-holes under the fold. Cut away all the wood outside of the marks, round off the lower edges, and shape the bow and stern. Do not cut out a keel, but make the bottom flat.

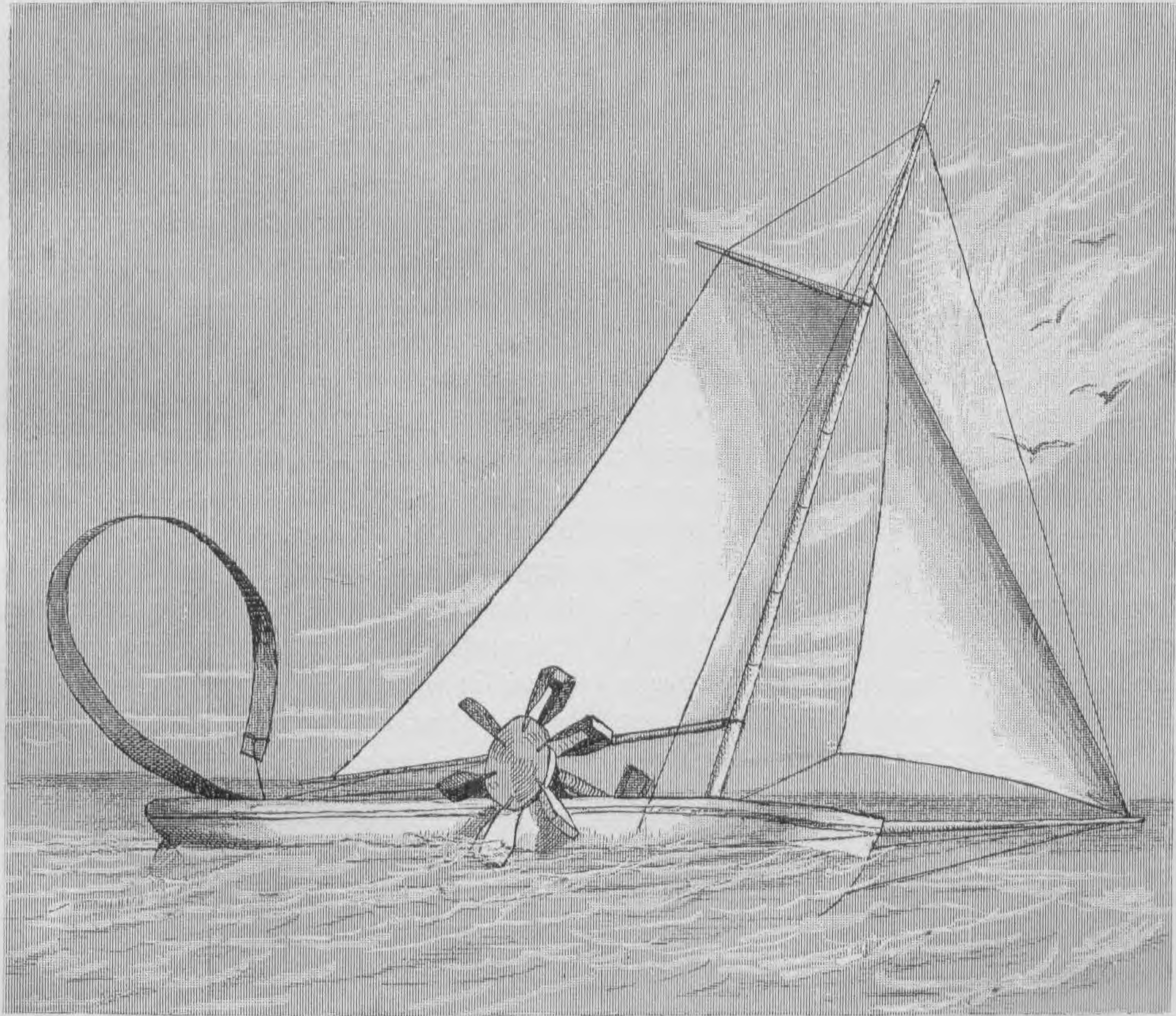
The hull may now be placed in a pan of water. If evenly shaped it will float level; if not, take it out and cut some wood from the side which floated highest — a careful look will show the spot from which to cut.

Place pieces of lead on the top until it sinks to within one fourth of an inch of the water. Keep

this lead by itself until ready to cast the keel. Make a mold, one eighth of an inch wide and fourteen inches long, from small strips. Bore an awl hole in the bottom at each end, and drive in round wooden pegs so that they do not touch the sides, and come up as high as the top of the mold. Place it level, in a fire shovel,

edges off smooth with the side, and cut the rail down in the center, so as to make it higher at the bow and stern. You will now have a very substantial, as well as a graceful hull.

Get a piece of thick wire, four and one half inches long, for a shaft (*Fig. 2, No. 1*). Whittle out two wheels an inch in diameter (*No. 2*).



UNDER WAY.

melt the lead kept separate, and pour it into the mold. You will now have a lead keel of the proper weight, with two holes for fastening to the bottom of the boat.

Lay the hull face down on a straight-grained pine board one fourth of an inch thick, and make a pencil line around the edge. With your knife cut out the center to within one fourth of an inch of the mark. Then with a small awl make holes inside the pencil line. Fasten the board to the hull with pins or small brads, driven through these holes. Trim the outside

Take a piece of tin, and cut out with an old pair of shears twelve buckets (*No. 3*). These should be three fourths of an inch wide. Bend up the edges on the dotted lines, and place them in the slots of the wheel. If you have a jig-saw you can saw these slots curved, so that the buckets will stay in place. If not, saw the slots straight with a common saw, and wedge them with soft pine wedges.

Whittle out two pillow-blocks (*No. 4*). In making them it is best to put the cart before the horse, *i. e.* bore the hole for the shaft, and

then whittle out the block around the hole, as it would be quite difficult to bore the hole after the block was cut out. Remove a piece of the rail the length of the base of the block, so that when the pillow-block is in place, the shaft will cross the boat at its widest point. Nail or screw the pillow-blocks firmly in place. Put in

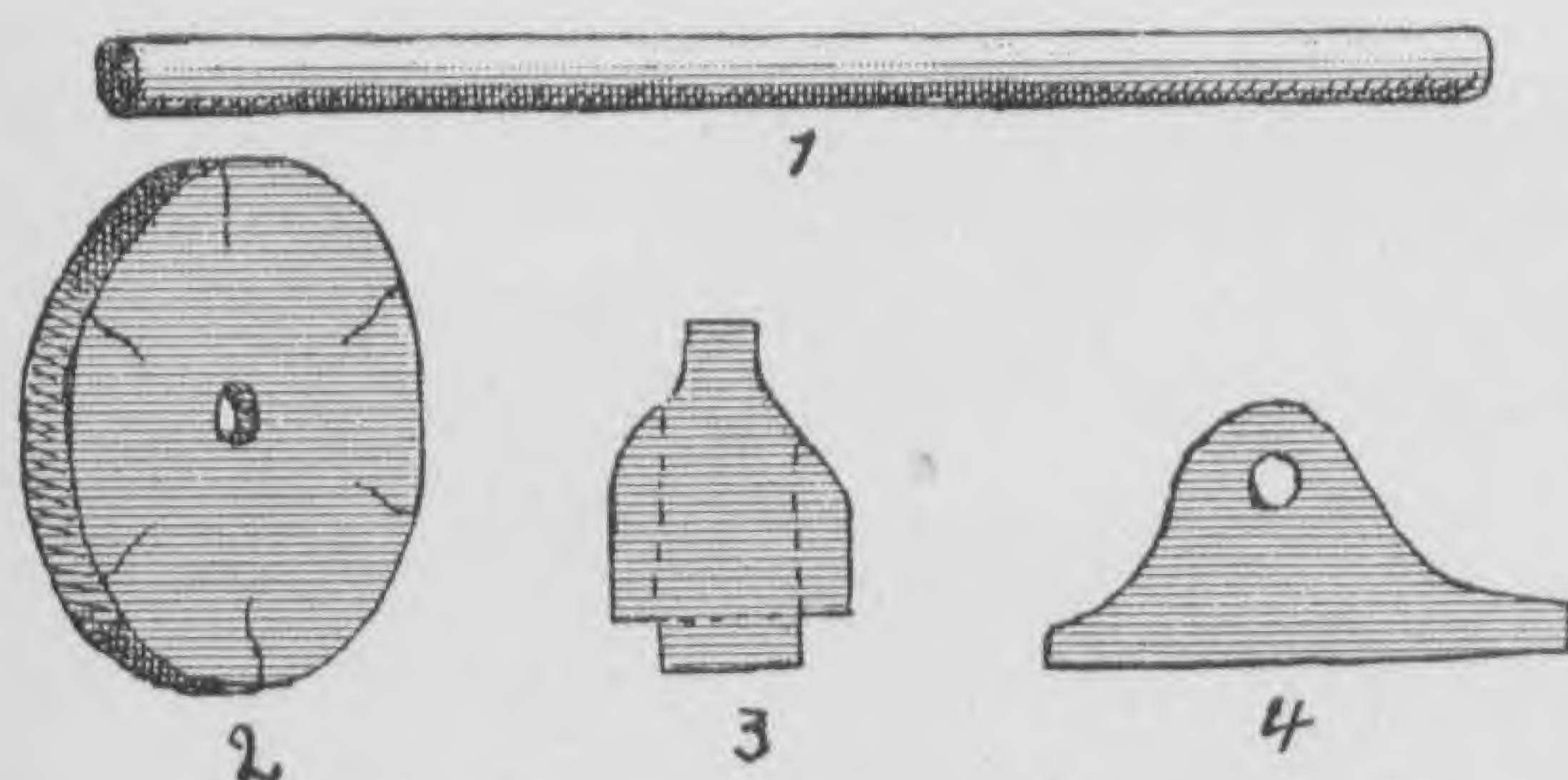


Fig. 2.

the shaft, and wedge the wheels on the end, so that they will turn without wobbling.

For the motive power get a straight spring; a corset spring will answer, but a better one may be purchased at a locksmith's for a few cents. A whalebone spring is lighter, but will not be so strong as steel. Bore a hole in the deck near the stern. This hole must make a very sharp angle with the deck, and hence a small hole must be cut with the knife to start the bit. Wedge the spring firmly into this hole, with two half-round wedges, so that it will hang

over the stern. Get a small picture ring and screw it into the deck just in front of the spring. Tie a piece of small fish-line to the free end of the spring, pass the end of the line through the ring in the deck, and tie the end firmly to the shaft, so that it will not slip.

To wind up the boat, take the end of the spring in one hand, and bending it down to the ring in the deck hold it there. Turn the paddle wheels, until the string is wound evenly and smoothly on the shaft. Set the boat in the water, and upon releasing the spring, it will start off in a very energetic manner. If the spring runs down too fast, bend out the edges of the buckets until the spring goes slower.

It is desirable in a boat of this kind to have some sails, so that in case the engine runs down, the boat will not be left out of reach in the pond.

Bore a quarter-inch hole three inches from the bow, and whittle out a mast thirteen inches high, and wedge this in the hole. Make a jib-boom five inches long, cutting the bottom of the large end sloping and flat, so that when pinned to the deck it will have the proper elevation. Cut a hole in the rail, at the bow, and nail the boom in its place, using two or three small brads. Put up the rigging as shown in the picture, and you will have a sloop-rigged steamer which will give you many hours of pleasure.

Henry Mann.

THE REGENT.

(Stories about Famous Precious Stones.)

OF all the gems which have served to adorn a crown or deck a beauty the Regent has perhaps had the most remarkable career. Bought, sold, stolen and lost, it has passed through many hands, always however leaving some mark of its passage, so that the historian can follow its devious course with some certainty. From its extraordinary size it has been impossible to confound it with any other diamond in the world; hence the absence of those conflicting statements with regard to it

which puzzle one at every turn in the cases of certain other historical jewels.

The first authentic appearance of this diamond in history was in December, 1701. In that month it was offered for sale by a diamond merchant named Jamchund to the Governor of Fort St. George near Madras, Mr. Thomas Pitt, the grandfather of the great Earl of Chatham.

Tradition says the stone was found by a slave at Partreal, a hundred and fifty miles south of Golconda. The native princes who worked

these diamond mines were very particular to see that all the large gems should be reserved to deck their own swarthy persons; hence there were most stringent regulations for the detection of theft. No person who was not above suspicion — and who indeed was ever above the suspicion of an absolute Asiatic prince? — might leave the mines without being thoroughly examined, inside and out, by means of purgatives, emetics and the like. Notwithstanding all these precautions however, the Regent was concealed in a wound made in the calf of the leg of a slave. The inspectors, I suppose, did not probe the wound deeply enough, for the slave got away safely with his prize and reached Madras. Alas! poor wretch, it was an evil day for him when he found the great rough diamond. On seeking out a purchaser he met with an English skipper who offered him a considerable sum for it; but on going to the ship, perhaps to get his money, he was slain and thrown overboard. The skipper then sold the stone to Jamchund for one thousand pounds (\$5000), took to drink and speedily succumbing to the combined effects of an evil conscience and delirium tremens hanged himself. Thus twice baptized in blood the great diamond was fairly launched upon its life of adventure.

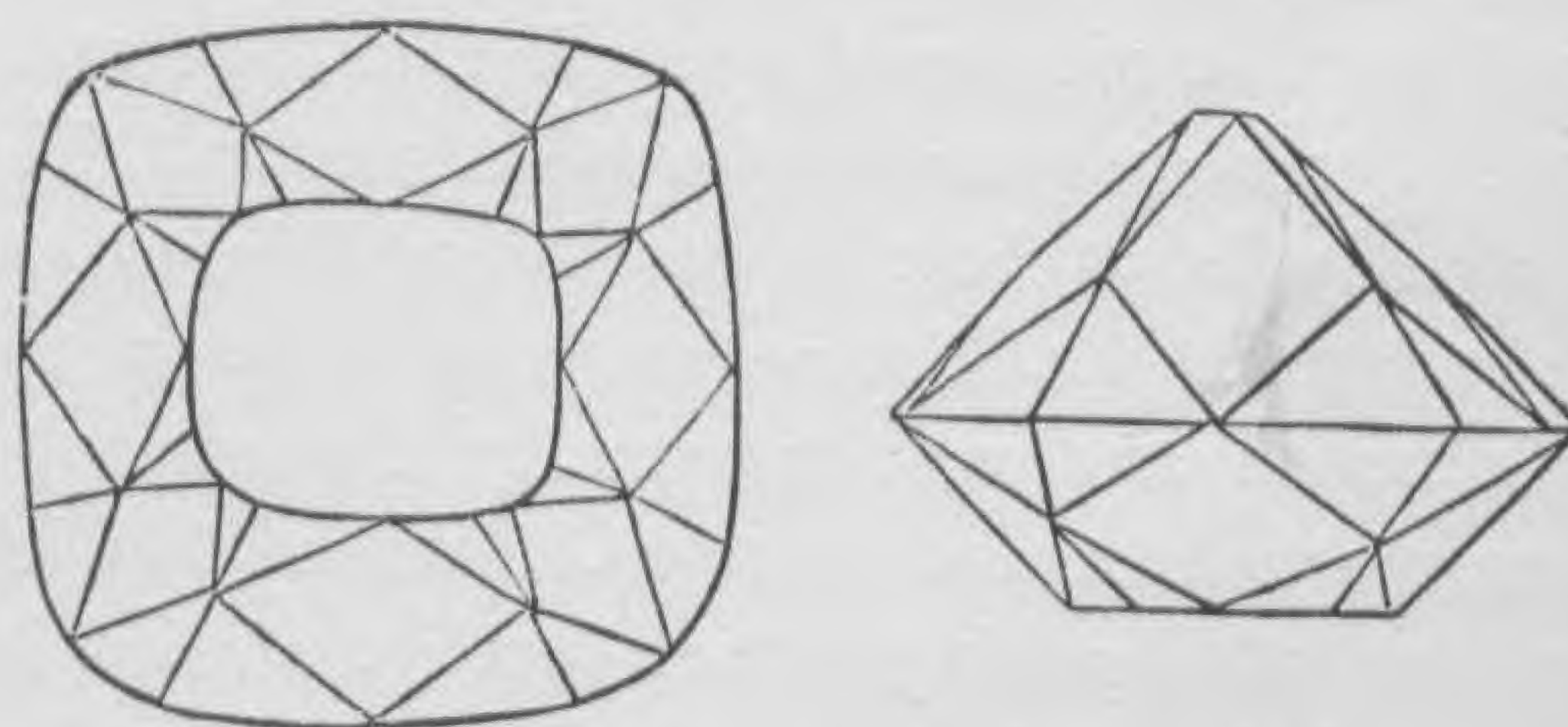
And now we come to the authentic part of its history.

Mr. Pitt has left a solemn document under his own hand and seal recounting his mercantile encounter with the Eastern Jamchund. It would appear from this notable writing that Mr. Pitt himself had been accused of stealing the diamond, for he begins with lamentations over the “most unparalleled villainy of William Fraser Thomas Frederick and Smapa, a black merchant,” who it would seem had sent a paper to Governor Addison (Mr. Pitt’s successor in Madras) intimating that Mr. Pitt had come unfairly by his treasure. The writer then calls down God to witness to his truthfulness and invokes His curse upon himself and his children should he here tell a lie.

After this solemn preamble, Mr. Pitt goes on minutely to describe his transaction with the diamond merchant; how in the end of 1701 Jamchund, in company with one Vincaty Chittee, called upon him in order to effect the sale of a

very large diamond. Mr. Pitt, who seems to have been himself a very considerable trader in precious stones, was appalled at the sum, two hundred thousand pagadas (\$400,000) asked for this diamond. He accordingly offered thirty thousand pagadas; but Jamchund went away unable to sacrifice his pebble for such a sum. They haggled over the matter for two months, meeting several times in the interval.

Finally Jamchund having resolved to go back into his own country once more presented himself, always attended by the faithful Vincaty Chittee, before the Governor, and offered his stone now for fifty thousand pagadas. Pitt then offered forty-five thousand, thinking that “if good it must prove a pennyworth.” Then Jamchund fell a thousand and Pitt rose a thousand. Now the bargain seemed pretty near conclusion; but it often happens that hucksters who have risen or fallen by pounds come to grief at the last moment over the pence that still separate them, so these two seemed unable to move further towards a settlement. Mr. Pitt



THE REGENT: TOP AND SIDE VIEWS.

went into his closet to a Mr. Benyon and had a chat over it with that gentleman who appears to have advised him to the purchase, remarking that a stone which was worth forty-seven thousand pagadas was surely worth forty-eight. Convinced by this reasoning the Governor went again to Jamchund and at last closed the bargain at forty-eight thousand pagadas (\$96,000). It was a lucky moment for him, since it was upon this minute but adamant corner-stone that the Governor of Fort St. George began to build up the fortunes of the great house of Pitt.

The diamond, valued far below its price in order not to attract attention, was sent home to England and lodged with bankers until Mr. Pitt’s return from India, when he had it cut

and polished. This process, the most critical one in the life of a diamond, was performed in an eminently satisfactory manner. The rough stone, which had weighed four hundred and ten carats, came forth from the hands of the cutter a pure and flawless brilliant of unparalleled lustre weighing one hundred and thirty-six and three fourths carats. It took two years to cut it, and the cost of the operation was ten thousand dollars; but its lucky owner had no reason to complain, since he sold the dust and fragments for no less than forty thousand dollars and still had the largest diamond in the world to dispose of.

This, however, proved to be no easy matter, for though many coveted it few persons were ready to give Mr. Pitt's price for it. One private individual did indeed offer four hundred thousand dollars, but he was not listened to. The fame of this wonderful stone soon spread over Europe. In 1710 an inquisitive German traveler, one Uffenbach, made "a wonderful journey" into England and tried to get a sight of it. But by this time Mr. Pitt and his diamond were so renowned a couple that the former must have been a most miserable person. The German tells us how it was impossible to see the stone, for Mr. Pitt never slept twice in the same house and was constantly changing his name when he came to town. Indeed his life was one of haunting terror lest he should be murdered for his jewel as the hapless slave had been in the very outset of its career.

At last, in 1717, he was relieved from his troubles. He sold the stone to the King of France, having in vain offered it to the other monarchs of Europe. The Duke of Saint Simon minutely chronicles the whole transaction. The model of the diamond, which was then known as the "Pitt," was brought to him by the famous Scotch financier, Law. At this time the Duke of Orleans ruled in France as regent for the boy who was afterwards to be Louis xv. The state of the French finances was well-nigh desperate. The people were starving, the national credit was *nil*, and the exchequer was almost if not quite empty. Nothing dismayed, however, by the dark outlook, that accomplished courtier, the Duke of Saint Simon, set himself to work upon the feelings of the Regent until he should

be persuaded to buy this unique gem. When the Regent feebly urged the want of money the Duke was ready with a plan for borrowing and pledging other jewels of the crown until the debt should be paid.

The Regent feared to be blamed for expending so extravagant a sum as two millions of money on a mere bauble; but the Duke instantly pointed out to him that what was right in an individual was inexpedient in a king, and what would be lavish extravagance in the one would in the other be but due regard for the dignity of the crown and the glory of the nation. In short says the courtier in his entertaining memoirs, "I never let Monsieur d'Orleans alone until I had obtained that he would purchase this stone." To such successful issue was his importunity brought. The financier Law did not let the great diamond pass through his hands without leaving some very substantial token of its passage. He seems to have received forty thousand dollars for his share in the negotiation.

It is instructive to learn that the Regent's fear of being blamed for the purchase was entirely groundless. On the contrary he received the applause of the nation for his spirited acquisition of a gem the price of which had terrified all the other monarchs of Europe; whereupon the Duke of Saint Simon remarks with complacency that much of the credit was due to him for having introduced the diamond to court. The sum actually paid to Mr. Pitt appears to have been one hundred and thirty-five thousand pounds sterling, equivalent to eight hundred and seventy-five thousand dollars, and the diamond received its name of Regent in compliment to the Duke of Orleans.

The Regent now enters upon a long period of tranquility, nothing conspicuous happening to it for many years. It pursued its way quietly as a royal gem during the reign of Louis xv., adding its lustre to the brilliant but dissolute court of that monarch. After a lapse of nearly sixty years the Regent again came forward upon a stately occasion in order to fitly decorate a king of France. It was on the eleventh of June, 1775, that the unfortunate youth Louis xvi. was crowned king in the ancient cathedral town of Rheims. A new crown of especial splendor was

made for the new king and in it were incorporated nearly all the royal jewels. The top of the diadem was ornamented by fleurs-de-lys made of precious stones. In the centre of the principal one blazed the Regent, flanked right and left by the "Sanci" and the "Gros Mazarin," while round about sparkled a thousand diamonds of lesser magnitude. Louis's gorgeous head-gear was no less than nine inches high, and it is said that the King, made dizzy by the immense weight of it, put up his hand several times to ease his poor head. At last he said peevishly "It hurts me"; simple, thoughtless words to which after-events have given a sad and most fateful significance.

One of the actors in this magnificent pageant was the King's youngest brother, the Count d'Artois, a handsome youth of such exquisite courtliness of manner that he obtained and kept through life the title of the *Vrai Chevalier*. We shall meet him again in still closer proximity to the Regent, fifty long years hence.

During the troubled reign of Louis XVI. the crown jewels including the Regent were lodged in the Garde Meuble where upon stated days they were exposed to public view. On the famous tenth of August, 1792, when Louis was deprived of his crown he was also relieved from the burden of looking after the Regent. It had at once become the National Diamond and as such belonged to everybody, hence everybody had a right to see it. In compliance with this popular notion the Regent was deposed from its regal niche in the crown of France and was securely fastened in a steel clasp. A stout chain was attached to the clasp and padlocked inside an iron window. Thus secured from the too affectionate grip of its million owners the Regent used to be passed out through the window and submitted to the admiration of all who asked to see it. As a further security policemen and detectives were liberally scattered about the place in the interest of national probity.

After the bloody days of the second and third of September when the ferocious mob of Paris broke into the prisons and massacred the unfortunate inmates, the Government imagined that the people should no longer be trusted with the custody of the Regent. Accordingly they

locked up all the crown jewels as securely as they could in the cupboards of the Garde Meuble and affixed the seals of the Commune most visibly thereto. Notwithstanding their precautions, however, the result does not seem to have justified their conclusions. On the seventeenth of the same month it fell to M. Roland, then Minister of the Interior, to make a grievous statement to the Assembly. He informed the deputies that in the course of the preceding night some desperate ruffians had broken into the Garde Meuble Nationale between two and three o'clock in the morning and had stolen thence jewels to an enormous value. Two of these ruffians had been arrested, but unfortunately not those who had the large diamond and other national property secreted upon their persons.

The two thieves then in custody upon being questioned gave, of course, answers which aroused the suspicions of these easily inflamed patriots. It seemed certain—so at least argued Roland—that the robbery had been planned by persons belonging to the late dominant aristocratic party in order to supply themselves with money to be used in paying the foreign troops who were to subdue France and again reduce her to slavery. He then proceeded to deliver an impassioned address upon this fertile theme. Patriot deputies freely accused each other of being the authors of this crime. Danton was pointed at by one party, while he retorted by naming Roland, minister as he was, as one who knew too much about it.

It seems probable however that none except the thieves themselves were concerned in this astonishing robbery and that they were actuated by greed alone. The patriots only made use of it for party purposes to obtain their own objects, just as they tried to utilize in the same way any uncommon natural phenomenon, such as comets, earthquakes or hail stones.

A few days later an anonymous letter was received by the officials at the Commune stating that if they searched in a spot most carefully described in the Allée des Veuves of the Champs Elysées, they would find something to their advantage. They accordingly hunted at the place indicated and found the Regent and a valuable agate vase. All the rest of the booty,

however, the thieves made off with after having thus eased their consciences of the weight of the great diamond.

We lose sight of the Regent in the black gloom that hangs over the Reign of Terror. There is however a persistent tradition, impossible now either to prove or disprove, that on the occasion of the marriage of Napoleon Bonaparte with Josephine Beauharnais in 1796 the former wore a most superb diamond in his sword hilt. Could this perchance have been the Regent? It is certainly difficult to imagine how Napoleon could have become possessed of the Regent at this date. Yet it is also difficult to imagine how the young man who was then an unknown and a poor general without an army although full of high expectations, could have become the owner of any diamond of such splendor as to attract the attention of at least two contemporary historians. It is just possible it may have been the peerless Regent already shedding its rays upon the blade of that sword destined to flash through Europe and to leave behind it so bloody a trail.

However this may be, it is certainly a fact that in 1800 Napoleon, then First Consul, pawned the Regent to the Berlin banker Trescow. With the money thus obtained he set out on that famous campaign beyond the Alps which ended at Marengo and which began his career of unexampled success. Thus once more the Regent may be said to have founded the fortune of a great house, but more aspiring in its second attempt it succeeded less effectually than in the case of Pitt. However in 1804 the house of Bonaparte had not fallen upon its ruin and it is some idea of this fact that gives color to the extraordinary revelations of the man called "Baba."

In 1805 several men were tried for having forged notes on the Bank of France, and one of them who went by the nickname of "Baba" made a full confession of how the forgeries were accomplished, and then, to the vast astonishment of the court, he delivered this theatrical speech: "This is not the first time that my avowals have been useful to society, and if I am condemned I will implore the mercy of the Emperor. Without me Napoleon would not have been on the throne; to me is due the suc-

cess at Marengo. I was one of the robbers of the Garde Meuble. I assisted my confederates to conceal the Regent diamond and other objects in the Champs Elysées as keeping them would have betrayed us. On a promise that was given to me of pardon I revealed the secret; the Regent was recovered and you are aware, gentlemen, that the magnificent diamond was pledged by the First Consul to the Batavian* government to procure the money which he so greatly needed."

There must have been some truth in Baba's statement, or at least the Tribunal considered there was, for he was not sent with his companions to the galleys, but was confined in the Bicêtre prison where he was known as "the man who stole the Regent."

Napoleon did not set the Regent in his imperial crown. Having redeemed it from the hands of Trescow for three millions of livres he mounted it in the hilt of his state-sword. There was something very fitting in this bestowal of the diamond. That the great soldier who had carved out his way to the throne with his sword should use the famous stone to ornament that blade was eminently appropriate.

On the first of April, 1810, the Regent was called upon to add its glory to the gorgeous scene in the long gallery of the Louvre on the occasion of the official marriage of Napoleon with Marie Louise. The Emperor who was very fond of splendid pageants was attired in the most magnificent apparel contained in the imperial wardrobes. But he seldom had the stoical patience demanded of those who pose as kings. He never could acquire the deliberate stateliness of Louis XIV. who was born and brought up within the narrow limits of regal etiquette. Indeed the Emperor was frequently known to divest himself of his costly robes in a very expeditious manner going so far as actually to kick—unholy sacrilege!—the imperial mantle out of his way. On the day of his marriage with the Archduchess the Regent was used to decorate the cap of the bridegroom. Madame Durand, one of the ladies-in-waiting to the new Empress, has left an account of the ceremony in which occurs the following passage:

* Evidently a mistake on Baba's part, as the Regent was pawned to a banker in Berlin.

"He (Napoleon) found his black velvet cap, adorned with eight rows of diamonds and three white plumes fastened by a knot with the Regent blazing in the centre of it, particularly troublesome. This splendid headgear was put on and taken off several times, and we tried many different ways of placing it before we succeeded."

Like poor Louis xvi. at his coronation Napoleon found that his sparkling top-hamper hurt him.

There was little opportunity for the Regent to appear fittingly after this event, although no doubt it was present at that kingly gathering in Dresden in the spring of 1812 when Napoleon in the plenitude of his power was starting upon the Russian campaign. But in the crash of a falling throne the imperial diamond is lost to view.

When Marie Louise escaped from Paris in 1814 flying before the advancing allies she took with her all the crown jewels, and specie to the amount of four millions. These valuables the fugitive Empress kept with her until she reached Orleans, where she was overtaken by M. Dudon a messenger from the newly-returned Bourbon king. This gentleman demanded and obtained the restoration of the money and the jewels. Thus the Regent was forced to abandon the fallen dynasty and to return to Paris to embellish the cap of the new king.

In the scrambling restoration of Louis xviii. it was impossible to have a coronation. Indeed the court of this returned Bourbon was of the quietest being under the dominion of Madame d'Angoulême an austere bigot, of a temper very different from that of her gay and pleasure-loving mother, Marie Antoinette. It was not until May, 1818, that there was anything like a fitting occasion for the Regent to appear. It was in that month the most delightful of all the months of the year in France, that the youthful bride of the Duke of Berri arrived from Naples. Louis xviii. resolved to have the young princess met in the forest of Fontainebleau, and thither accordingly the whole court migrated on the previous day. It was the king's wish that the meeting should take place in a tent pitched in the stately forest. Perhaps he dreaded the imperial memories that still haunted the chateau, Napoleon's favorite residence where he had given his splendid hunting fêtes. The king

arrayed himself sumptuously in a velvet coat of royal blue embroidered with seed pearls, and the Regent was placed in the front of his kingly cap while his sword was decorated by the less brilliant Sanci diamond. Thus regally adorned the King, too fat and gouty to stand in a royal attitude, was majestically seated in his arm-chair where he was discovered by the youthful Caroline when she tripped lightly into the tent.

Charles x. was destined to enjoy the Regent but for a few brief years. Having succeeded to the throne on the death of his brother in September, 1824, he made his state entry into his capital in the first days of October. This Charles, now an old man, is the youthful Count d'Artois who figured at the coronation of Louis xvi. half a century before. Hardly was the late king laid to his rest in the sombre vaults of St. Denis when his successor laid his hands upon the Regent. The grand diamond sparkled upon the hat of the elderly monarch when bowing and smiling he made his entry into Paris as King of France. He was very fond of display, the Vrai Chevalier of the olden time, and spent months devising the most perfect and complete of coronations. Everything was to be conducted according to the strict old court etiquette; even the dresses of the ladies were designed from fashion plates of the time of Marie de Médicis. This was the last king of France crowned at Rheims, none but the elder Bourbons having dared to face the legitimate traditions of the sleepy old town. A new crown most splendidly garnished with diamonds was made especially for Charles who was duly anointed. But it all availed not to keep him on his infirm throne. He abdicated in 1830 when at St. Cloud and proceeded with royal slowness to quit the kingdom.

He retained however his hold over the crown jewels while relinquishing the crown itself, for he carried the Regent and all the rest of the diamonds off to Rambouillet. As soon as the municipal government in Paris became aware of this fact they sent two agents to receive the precious objects from the hands of the ex-king. But his dethroned majesty would not give them up, whereupon a column of six thousand troops marched upon Rambouillet, and Charles was convinced by the irresistible logic of their flash-

ing bayonets. He surrendered the Regent and other gems which were instantly appropriated by his "good cousin of Orleans," Louis Philippe.

He again in turn was obliged to fly and leave his diamonds behind; so that the Regent was found by Louis Napoleon amongst the other treasures of the country when he laid hold of the vacant crown of France. The late Emperor had it set in the imperial diadem. It was shown to the world at large in the two French exhibitions, where in 1867 the present writer had the gratification of beholding it. It is a thick, square-proportioned diamond about the size of a Claude plum with a very large top surface, technically the table, and it gives forth even in daylight the most vivid rays. One authority on precious stones observes that the Regent is not cut to rule, being too thick for its size, but he quaintly remarks that such a diamond is above law. The Regent may do as it likes, but smaller stones should beware how they imitate peculiarities which in them would be called defects.

On the outbreak of the Franco-Prussian War in 1870 the Regent and its glittering companions in glory were safely lodged in a sea-girt

fortress. But Napoleon never returned to redeem them.

From the day when this peerless diamond first came to France it has always been a sovereign gem in the strictest sense of the term. It has never been used to adorn any one but the reigning monarch, and has never condescended to deck the brow of a woman.

During the present Republic the Regent has dwelt somewhat in obscurity. It lies snugly put away along with the other crown jewels in the vaults of the Ministère des Finances. But when the Chamber some two years since decreed that crown jewels should be sold by auction, they exempted the Regent. Republican France will not sell the Regent. This is a very remarkable fact, and would have eased the mind of the old Duke of Orleans could he have foreseen it. This sparkling gem, which he dreaded to buy fearing the censure of his people, has now sunk so deeply into their affections that even after the final extinction of the race of Bourbons which it was bought to adorn the same people, now being sovereign, cannot bring themselves to part with it.

Mrs. Goddard Orpen.

THE LABOR OF A GIANT.

(A Long Line of Hills.)

A YEAR ago last spring a young fellow and I took a long walk through Southern Minnesota and Northern Iowa. It was not a good time of year for a tramp—the ice and snow were melting; all the streams were flooded; ice water filled every hollow; the country roads were muddy; the air cold and the wind high and bitter.

I shall never undertake such a trip again in that season. We walked eighty-three miles in three days and my readers can hardly imagine what we endured.

What do you suppose it was for? We were not taking orders for fruit trees or selling books. No, we were trying to trace a long line of hills. Queer hills they are too. You may have seen

some of them many a time but perhaps have not thought anything about them. They are not very high, but they are of interest and I wanted to become acquainted with them so that I might know hills of that kind when I saw them elsewhere.

We were on these hills all of three days, but they were much finer at some places than others. I remember two places where they are particularly interesting. One of these we reached at two o'clock one afternoon. There were hills—round, smooth hills—dozens and scores of them in every direction. Beautifully regular, kettle-shaped hollows were between them. These were filled with water from the melted snow and ice. The hills themselves were

covered with low bushes. As far as the eye could see were hills, like the waves of the sea. It was a bleak and dreary outlook, but in summer it might be beautiful.

The second spot was in Hancock County. It was near evening of our last day's walk. We had reached the prairie country and we turned to look back over the region we had traversed. Our hills rose in smooth hummocks, behind one another, higher and higher to Pilot Mound, fifteen miles away, which, two hundred and fifty feet high, is the highest of them all.

We followed these hills for eighty miles and more, a long line, but other men have traced it much farther. It runs off to the south nearly to Des Moines and then turning to the northwest re-enters Minnesota and passes through Dakota into Canada. Then toward the east it continues, past St. Paul, nearly to Lake Superior and then follows an irregular line south of the Great Lakes, through Michigan, Wisconsin, Illinois, Indiana, Ohio, Pennsylvania, New York and New Jersey to the sea. The line is broken here and there for some miles, but it is practically one. It does not stop even there, but runs out Long Island and then across the Sound on to Cape Cod. A very long line of hills indeed! All along this line the hills are much as I have described them.

These hills tell a strange story. If we find some place where one of them is cut through by a railroad, we may see its structure and perhaps get an idea of how it was made. It is composed of gravel and sand and clay with pebbles of every size in it. We find too some great boulders or "niggerheads." The sand and gravel in the upper part of the hill may be somewhat in layers and the pebbles may be somewhat rounded and smoothed. The lower part however will be of harder clay with no arrangement into layers, filled with pebbles of all sizes and shapes, somewhat sharp as well as rounded.

A geologist would tell you that many of the stones in this hill must have come from miles away—perhaps from Canada or up around the Great Lakes. A few days ago I saw a piece of pure copper that had been found in such a hill, but I feel sure that it came originally from Lake Superior. So we have this fact about the

hill—it is made of stones and sand that have been brought from a distance.

If we could cart away this whole hill until we laid bare the hard rock many feet below it, we should perhaps find its surface planed level and myriad scratches and lines upon it. These lines run in many directions and often cross each other, but there is one set of scratches more numerous and better marked than the rest, and this set we can trace for many miles. Not that any one scratch can be followed far, but the "set" can be. If we should trace it right up it would bring us to Lake Superior and to the place where the little piece of copper came from. We might find pieces of copper all along the way, but they would be more numerous and larger as we approach the Lake. Here we have a second fact about our hill. We may



KETTLE MORaine HILLS.

suspect that whatever giant force brought its material southward has followed the path traced by these lines or scratches.

The giant is gone from here. I am told however that he is hard at work, dropping pebbles and making hills, in Switzerland now. The hills can be seen making. The giant at work is a glacier, a great river of solid ice, moving slowly down its valley. Great rock-masses fall from the cliffs on either side on to the glacier's surface and are carried down the mountain as easily by the ice-stream as chips are by a river. The weight of the ice and the sand and pebbles it has frozen in it grind and smooth the rock-bed below. Hundreds of sharp pebbles frozen in the bottom of the ice scratch the rock-bed in every direction, but particularly in the direction of the glacial flow. At the lower end the ice is melting all the time, and here it drops its loads

of boulders, pebbles and sand, and great heaps are built up—just such heaps as make up our “long line of hills.” They make the glacier’s “moraine.”

Now I believe that our long line of hills was made in that way. Thousands of years ago, the whole area north of our line of hills (which we



A GLACIER.

will now call a “moraine”) looked very different from the way it looks now. None of these hills were in existence. The scenery was wilder and rougher than now, with deep gullies and gorges and rock-walled streams. Some parts were covered with soil to a great depth. This soil had been made by the decay of rocks, and pieces of rock not yet worn to pieces might occur loose in the soil. In fact, I suspect there was a great quantity of loose stones lying everywhere. These would however be of the same kind as the rock-bed below, and not unlike them, as are the boulders. In the Lake Superior district I suppose there were plenty of loose masses of copper and iron and jasper.

The climate began to change. Year by year it became colder until at last snow lay on the ground the year through. The snow gradually solidified and changed to ice. The soil was frozen down to bed-rock. There was some place however where the ice and snow was thickest, or at least highest, and from this point as a centre the ice flowed in every direction. This point was perhaps in the neighborhood of Hudson’s Bay. The whole great ice-mass was moving slowly but surely. The great blocks of imbedded stone, the soil, the copper—all were being carried away from their original locality.

Think of such a great ice-sheet covering all of North America north of our moraine hills! Imagine its great ice-surface stretching for hundreds of miles in every direction! What an immense burden of material it carried frozen in its mass! Tremendously thick it was, so that it flowed right on over mountains and hills as a stream of water flows over the stones in its course. Even at its southern edge, where it was at its thinnest, it was from five hundred or six hundred feet to twenty-three hundred feet thick. I think it was Agassiz who said that a sheet of glacial ice can only flow over a hillock, if its thickness is half again as great as the hill’s height. In Pennsylvania, near the glacier’s southern edge, it rode over the Blue Mountain, there fifteen hundred feet high; so the glacier must have been at least twenty-two hundred feet thick. Further west the ice-sheet was not so thick at its lower edge. What a wall of ice it must have been at its end! Here it was all the time melting and dropping its burden and building up the great moraine.

But at last the climate changed once more. The glacier began to shrink away. It was many years in melting, but finally it was gone. It must have dropped material, as it shrunk away, all over the country between the moraine and the old glacial centre.

I hope now you understand the Moraine and the Glacial Period somewhat.

There are three things more I want to speak of in connection with our long line of hills. One day, when I was a student in Pennsylvania, I walked from Easton down to the “Narrows” on the Delaware. It is a beautiful place. The river flows between great banks of red sandstone that rise almost perpendicularly for two hundred feet above the water. These cliffs are furrowed by streamlets into little gullies. The rocks in these are always damp and cool, and ice and snow remain here late into the spring. A pretty little plant grows here called “rose-root.” Its botanical name is *Sedum rhodiola*. It is much like the “live-for-ever” that children like so much because they make purses out of its thick leaves. This little rose-root grows in pretty bright green tufts here and there in the dampest and coldest spots on the cliffs. It has a strange history. It is found only in a few

places in the United States. Quoddy Head, Me., on the summit of a North Carolina mountain, and at the Narrows, are the only homes of it known. In Labrador however it is very common in cold damp spots.

How did it get to these three spots — in Maine, North Carolina and Pennsylvania?

Our glacier explains it. This plant likes cold weather and grows best near "snow-line." I suppose before the glacier it grew well north. As the ice and snow began to gather and the cold weather to increase the little rose-root was driven south ahead of the sheet of snow and ice. At last the glacier was at its height. The plant then grew plentifully as far south as North Carolina. When the ice retreated the plant followed it northward so as to get the cold it loved so well. At some places however ice would linger as little glaciers long after the great mass was gone. The Narrows and the mountain are such places, and now, when the ice has all disappeared, the "rose-roots" are left stranded.

Another curious thing connected with our line of hills is a point in geography. Notice how the Minnesota River runs. It passes through a district that slopes to the north, but the river flows south and has cut its way through the ridge in order to do so. What has made this river flow against the country slope? The glacier was melting away. It had left the long line of hills to the south and this had acted as a dam to the water from the melting ice. So there was a great lake covering that country, hemmed in on the south by the moraine and on the north by the ice-wall. The water rose until it was high enough to overflow the moraine dam, and then it flowed southward draining the lake as it cut a deeper and deeper channel. The channel once formed has continued in use, though the ice-wall on the north, necessary at first to set back the water, has long since disappeared.

I was at Chautauqua Lake this summer. This Lake is only eight miles away from Lake Erie, but it sends its waters southward to the Ohio River and thence to the Gulf of Mexico. The "divide" lies between Lake Erie and Lake Chautauqua. Water falling upon it drains one

way into Lake Erie and the Gulf of St. Lawrence, the other way into the Mexican Sea. Our line of hills is that divide. Of course before the time of the Glacier it was not there. Neither was Chautauqua Lake. A great river flowed northward into Lake Erie at this place. But the glacier came, its heavy burden of rocks and sand and clay was dumped here. The divide was made; the old river channel was filled up. The basin of Chautauqua Lake was formed in the midst of the moraine. What wonderful changes are due to the ice-sheet and our long line of hills.

I want you to remember the long line of hills — how it was formed; the scratched rock-bed; the traveled stones; the changed geography. Remember how the old ice-sheet has caused rivers to be turned into new channels, lakes to



THE SEDUM RHODIOLA.

be formed, and plants and animals to move from one place to another. No one knows just when the Glacial Period occurred, but our long line of hills tells us its story even though it is such an old, old history.

Frederick Starr.

FROM THE YEAR OF THE ELEPHANT TO THE HEGIRA.

(*Search-Questions in Mahometan History.*)

1. To what early Scriptural character do Mahometan legends ascribe the founding of Mecca?

2. What famous buildings are he and his father said to have erected there?

3. Of what general character was the government of Arabia before the time of Mahomet?

4. At this period what chiefs or sheiks were of most importance in Arabia?

5. What was the name of the sacred well at Mecca?

6. Why was A. D. 570 called "The Year of the Elephant"?

7. What two families were most powerful in Mecca before the birth of Mahomet?

8. What is the date of the birth of Mahomet?

9. What is the meaning of the name Mohammed or Mahomet?

10. In what humble occupation was a part of Mahomet's youth spent?

11. What title did his modesty and sobriety gain for him as a young man among the people of Mecca?

12. Whom did he marry at the age of twenty-five?

13. As Mahomet approached his fortieth year what change took place in his character? Where did he frequently go for seclusion?

14. How old was Mahomet when he declared himself a prophet?

15. How many converts did he gain in the first three or four years of his ministry?

16. What is meant by the first Hegira?

17. What domestic affliction happened to Mahomet in the tenth year of his mission?

18. What important event in the history of Mahometanism occurred in 620?

19. To what place did the hopes of the prophet now turn?

20. What is the date of the great Hegira, or flight to Medina?

ANSWERS TO OCTOBER SEARCH-QUESTIONS.

201. The Apostate. He abjured Christianity and endeavored to restore paganism.

202. Valentinian I.

203. Theodosius the Great.

204. Honorius.

205. Alaric, the Goth.

206. The sack of Rome by Alaric.

207. In that of Honorius.

208. In 455.

209. Romulus Augustus.

210. Odoacer. He abolished the title of Emperor of Rome and styled himself King of Italy in 476.

211. Eudoxia, who was the bitter enemy of St. Chrysostom.

212. Theodosius was controlled by his wife Pulcheria as his cousin Valentinian III. was ruled by Placidia, who was the mother of Valentinian and aunt of Theodosius.

213. For his compilations of statute law called the Justinian Code and the Digests or Pandects as well as other legal works. Belisarius.

214. John Zimisces.

215. Zöe, the consort first of Romanus Argyropulus.

216. Alexis or Alexius I. Comnenus.

217. Its capture by the Latins.

218. At Nice. During this period the line of Latin emperors, beginning with Baldwin I., reigned at Constantinople.

219. In 1352 in a naval battle under the walls of Constantinople.

220. May 29, 1453.

Osar Fay Adams.



FIRE-BUILDING.

(Cooking in the Public Schools.)

THE roll is called, the girls are in their uniforms—that is, the apron, the cap, the holder suspended by a tape from the belt, always in readiness for use, and the hand-towel pinned to the side. Rings and bracelets—if any one is so thoughtless as to wear them to a cooking-lesson—are laid aside, the hands are washed, and the nails looked after; for the first lesson of the first lesson—as well as of every succeeding one—is that of personal cleanliness. This lesson is repeated all the way along too. The hands are washed as often as needed; and always before touching any food they are wiped on the towel at the side. That is why the towel hangs there.

The three housekeepers are chosen; out of each class of fifteen, three are called housekeepers, while the rest are cooks. The three housekeepers do the kitchen work, and each one has her own special set of duties.

The lists of duties for the housekeepers are printed plainly on a blackboard, so that each knows just what she has to do, and there is no interference of tasks between the three. In this way everything is done at its own proper time, and by the proper person. The rules for the housekeepers are like this:*

HOUSEKEEPER NUMBER ONE.

- Get kindlings and coal.
- Build the fire.
- Regulate the dampers.
- Empty ashes into sifter.
- Brush the stove under and around it.
- Blacken the stove.
- Light the fire.
- Polish the stove.

*These rules are copied from the blackboard of School Kitchen No. 1, where they were placed in October, 1886.

- Regulate the dampers.
- Fill tea-kettle and reservoir with fresh water.
- Wash the hearth or zinc under the stove.
- Wash the cloth and put to dry.
- Sift the ashes.
- Bring the cinders to the kitchen.

This is what Housekeeper Number One has to do in the morning class. The Afternoon Housekeeper Number One must

- Regulate the fire.
- Replenish the kettles.
- Empty the kettles and copper boiler, and turn them over to dry.

The last things, of course, are to be done when the lesson is ended.

HOUSEKEEPER NUMBER TWO.

Dust the room thoroughly. Begin at one corner, and take each article in turn. Dust from the highest things to the lowest, taking up the dust in the cloth, but not brushing it off on the floor. Shake the duster occasionally in a suitable place, and when through, wash and hang it to dry.

- Bring the stores to teacher when directed.
- Scrub the dresser and teacher's desk.
- Keep the dresser in perfect order.
- Wipe dishes if needed.

Sweep the room when the lesson is over, beginning at one side, and sweeping toward one place. Hold the broom close to the floor; sweep with short strokes, and let the broom take the dust along the floor, instead of tossing it into the air.

HOUSEKEEPER NUMBER THREE.

- Polish the boiler.
- Clean knives and spoons in dresser drawer.
- Wash and wipe dishes.
- Wash dish towels.
- Scrub sink outside and in with hot suds.
- Wash cloth and hang to dry.

I think it wouldn't be a half-bad idea to have a set of similar rules, condensed for family purposes, printed and hung in every kitchen; though I'm not at all sure that you could get



A SCHOOL KITCHEN.

(Showing compartments around table with gas stoves, etc.)

the girls to read them. The home-girls would, but the hired ones wouldn't.

Of course the same girls do not act as housekeepers all the time. It is arranged that these duties are shared in alternation, in order that every pupil may learn both the cooking and the kitchen work.

When everything is in readiness the teacher gives the pupils a little preliminary talk about cooking in general, and they bring out their note-books and pencils, and write down all the points she gives them, so that they may be ready to answer the questions at the next lesson. And more than this, they must remember it, for they have to be examined in their knowledge of this branch of study as in any other, and are marked by the same system of percentage.

In the first place the teacher gives them the

definition of cooking; and they are told that it is the preparation of food by the aid of heat to nourish the human body: Food is cooked to render it more palatable, and more easy of digestion; to make it assimilate with our bodies, and do us good by giving us strength. Among the agents necessary for cooking, the most important are heat, liquid and air. Then follows a short lesson on practical chemistry, giving special information about the four most important elements, namely, oxygen, nitrogen, hydrogen and carbon.

Then follows the lesson on fire-building, the teacher superintending and giving the directions, and Housekeeper Number One following them, while the rest of the class look on and listen. It is only in the early lessons that the instruction is needed; after a while the girls get to be the most expert fire-builders that can be imagined, and what is quite as much to the purpose, as every housekeeper of experience will tell you, they know how to tend it and keep it with economy; something by the way that a good many housekeepers themselves don't understand. You see the mere "knowing how" to do anything isn't all there is of a lesson. You must understand how to make the knowledge attained available; that is the true education. A person may acquire a knowledge of a great many things, but if she doesn't know what use to make of it she might as well be without it, for all the real good it does her. She is not educated; she is merely hampered with a lot of useless facts that lumber her intellect with cumbersome stuff.

But we are learning to make a fire; and the first thing to be done is to remove all the covers from the stove, and brush all the ashes from the top of the inside into the fire-box; this keeps the heat channel clear, and makes the oven easier to heat, and keeps the stove in constant cleanliness. Then the covers are replaced and the dampers closed. This, you will understand, is done to keep the fine dust from escaping when you empty the contents of the fire-box into the pan. Most kitchen girls neglect this precaution, and then they wonder where all the dust in their kitchens comes from. The public school-girls could tell them all about it. When the stove has been closed as tightly as possible, the direc-

tions are to turn over the grate, letting the contents fall into the ash-pan below. Turn the grate back to its place, after clearing it of any clinging substance. Brush out the oven after the dust has ceased to rise, and then it will be clean for use and free from dust when you are ready to bake in it. If there should not be a double grate, as there is not except in some of the newest ranges, remove the ashes and cinders together and sift them. Always take the ashes out before lighting the fire, for if they are left in the pan, sparks and lighted coals will drop into them. It is then very unsafe to remove them unless you have a fire-proof ash-receiver into which to place them. Fires are often traceable to the careless disposition of hot ashes. You can readily see what mischief might occur from putting ashes containing live coals into a wooden barrel or box.

And now that the stove is cleaned and the ashes and cinders taken care of the next thing is to make the fire. Of course you all know without telling that the fire box is the part of the stove or range that holds the fire. Now into this fire box you want to put, first of all, loose pieces of newspaper, that have been torn in strips; these go at the very bottom, resting on the grate; use plenty of paper, so that the kindling may have a chance to light before the paper is burned out. Next, lay small pieces of light wood across the box, leaving little spaces between the pieces; on these put a layer of kindling a little larger than the first layer, putting the sticks at right angles with the lower ones; on these again place fine hard wood kindling, then larger hard wood, and finally a thin layer of small coal. In this way you will have little trouble in making the fire burn. Each layer, as it burns, heats the one above it. Now you see there is a distinction between building a fire and lighting it.

Now the fire is built, and the covers are replaced. The housekeeper starts to light the fire, but on being referred to her rules, she finds that the next thing to be done is to open the dampers, remove the ash-pan and sift the ashes, replace the pan, and brush the dust off the stove. Then she blackens her stove, first moistening the polish with water, then rubbing the polish on with a cloth kept for such use. Then

it is time to light the paper from under the grate, and while the fire is beginning to burn she polishes the stove with her dry brush. Here is something else to remember: blacken the stove while it is cold, but polish it as it begins to heat.

Watch well while the wood and coal are kindling, so as to be ready to add more coal as soon as it is necessary, since if you do not, it will refuse to kindle when you do put it on, and then you will have the fun—and it isn't such good fun either—of doing your work all over again. But if you give the necessary thought and care to it, you need never have this trouble. After your first coal has well kindled, you should add enough to come nearly to the top of the fire box, and then you may feel assured that everything is right. Here you see one of the homely old proverbs verified, "More haste, less speed." You can't make a coal fire at haphazard; you



BUILDING A FIRE.

have got to go about it systematically. If you have charcoal or Franklin coal, it may be put on at first with the wood.

When the blue flame is no longer seen, close

the oven damper; and as soon as the coal is burning freely, shut the front damper. Then regulate the fire by the slide or damper in the pipe. While making and watching the fire, empty the tea-kettle, wipe out the inside, fill it and the reservoir with fresh water — never fill them from the hot-water tank — doesn't it seem absurd to have to say this? — finish polishing the sides and back of the range, and brush up the hearth and floor.

Now we are ready for some cooking. But stop a minute; there is more to be said before that is begun. We must keep the fire, now it is made, and you will need some directions for that. So we will listen while the teacher gives them:

Somebody has said that it "takes a wise man to build a fire and a philosopher to keep it." We have shown that it requires judgment if not real wisdom to get our fire well going, and certainly it requires thought to keep it. It needs attention, not in a fussy, but in a common-sense way. In the first place, one thing to be well borne in mind is that the coal should never come above the top of the lining of the fire-box. It chokes the entrance to the oven channel, making it impossible for a steady heat to circulate freely there; and it spoils the stove by warping the covers and cracking them. So you see it is bad economy. The fuel is wasted and the stove is spoiled. If you need a steadily hot fire for some time, replenish often and add but a little coal at a time.

If you do not need to use the fire, but wish to keep it along, add fresh coal, and when the gas

is burned off, which will be as soon as the blue flame dancing over it disappears, close all the dampers, so there will be no draught, and your fire will keep a long time. When you wish to quicken your fire again after it has been closed a long time, open all the dampers, to give draughts to enliven it. If some of the coal remains black on the top, you may poke away the ashes underneath with the poker, then when it is burning add coal and shake it gently to clear the grate. But if the coal is red, then you must not poke it, or you will put it out. Add a few coals at a time, but not enough to choke it or cool it. When your first pieces are kindled add a few more, and when these are burning you may then venture to give a gentle shake or quiet poke to the fire, but be very careful that you do not shake or poke too much, lest you deaden your fire again, possibly putting it out altogether.

With all this instruction the teacher gives little lessons in chemistry, that are illustrated by the work that is done in the fire-building, and in this way the pupils are taught not only the how but the why; for you see in a thorough drill of this kind it is very important to "mind the whys and wherefores."

I think, after these explicit directions, any girl can build and keep a fire even if she hasn't been to the cooking school. And this is a very important lesson, you may be sure, because no other lesson can well be given until the fire-building is fully understood, for what good will all the rules for dishes do, if you haven't the fire to cook them by?

Sallie Joy White.

THE SELF-TACKING SCHOONER.

(Winter Work in a Boy's Workshop.)

AS the name implies this is a schooner which tacks all by itself. It starts off on the "starboard tack," "comes up into the wind," the sails fill again, and off it goes on the port tack, and so on until it crosses the pond.

It is always a matter of great curiosity to

boys; they cannot see what makes the boat act so — there are no strings or any arrangement by which to manage the vessel from ashore, and when they see it make a "long and a short leg," they are still more mystified. The whole knack is simple and easy to be understood,

and any boy by following these directions may make one.

The hull is exactly like the one described for the steamboat in a recent article* except that

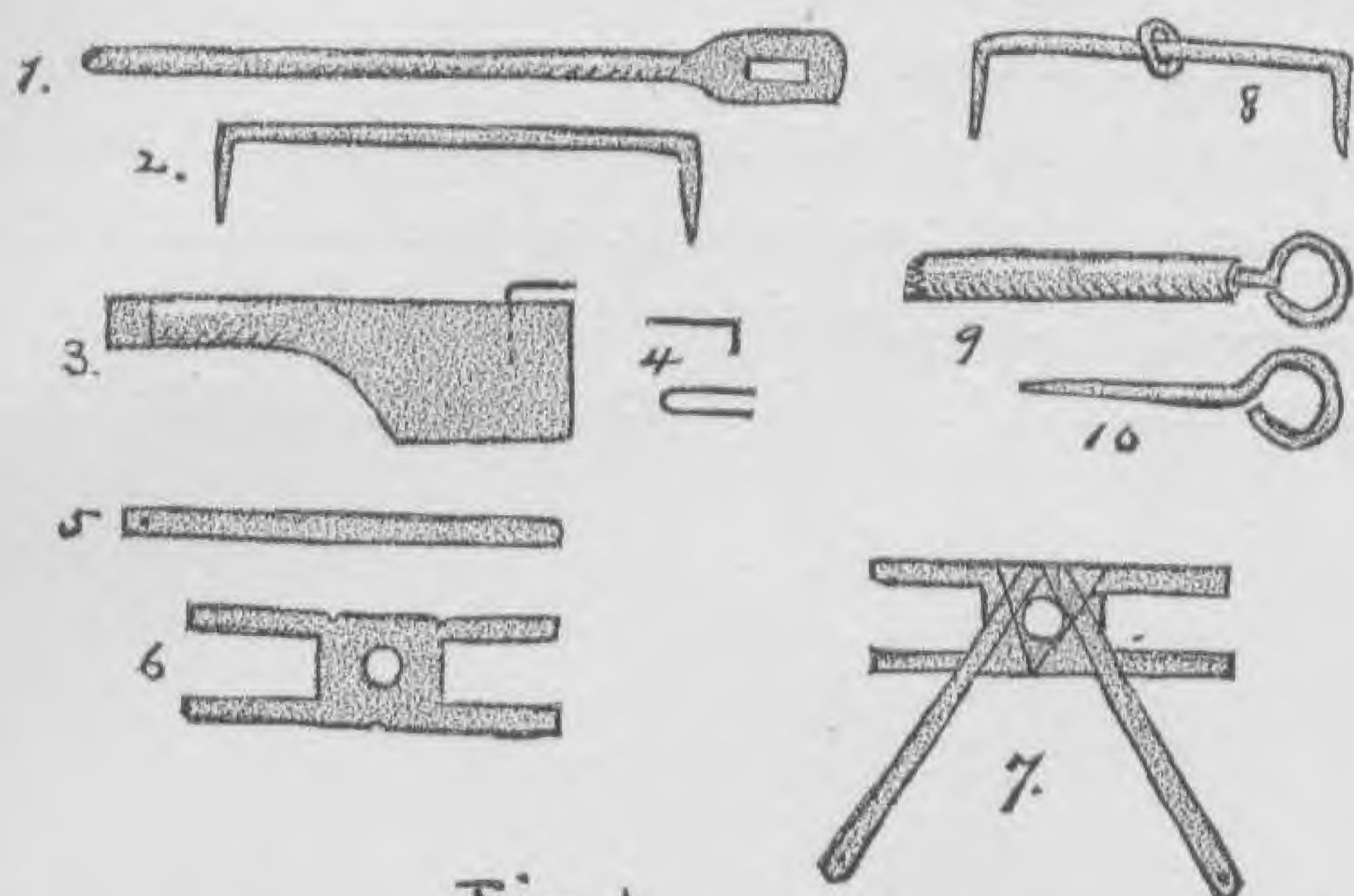


Fig. 1.

all the dimensions are doubled, *i. e.*, twenty-eight inches long, seven inches broad, etc. The hull is made from a piece of two-inch plank and the rail from a half-inch board.

We will suppose you have the hull finished. Bore a half-inch hole for the foremast six inches from the bow ; for the mainmast eighteen inches from the bow. Whittle out the masts thirty and thirty-one inches long. Get some large copper wire and make four ring-bolts (*Fig. 1. No. 10*). The rings must be large enough to slip over the masts easily. The best way to make them is to take a round stick the size you wish the rings, and bend the wire around it, making two complete turns. Cut the wire in the middle so that you will have two ends, each one with a ring bent slightly sideways ; bend them straight, sharpen the ends with a file, and they are ready.

Whittle out a main-boom twenty inches long (this is the stick which spreads the lower edge of the mainsail); a fore-boom eleven inches long; a main and fore-gaff each nine inches (these spread the top of the sails). With a small awl bore a hole in the end of each boom and gaff, and drive in the ring-bolts as shown in *No. 9*.

You will now have very strong and neat booms. Take two pieces of the wire, four inches long, and bend down the ends (like *No. 2*). Make two smaller rings as before, without any tails, slip them over the bent pieces, and you have the travelers (*No. 8*). Whittle out four spreaders

(No. 5) three inches long, and two pieces (No. 6). Fasten the spreaders across No. 6, as shown complete (No. 7). These are the tops; their use is shown in the picture.

Make the rudder (No. 3) of wood; it must be made small so that the boat will not turn too quickly. The blade should be about three fourths of an inch wide. Make the pintles (No. 4) and drive the hook into the rudder as shown, and then drive the staple into the stern, so that the rudder will swing on it. Whittle out the tiller (No. 1) four inches long. Bore a hole in the stern for the rudder, put it in place and fasten on the tiller. Bore two holes in the deck for the traveler (No. 2), which is placed so that the tiller moves under it (see the picture).

Next put the other two travelers with the rings in position, just in front of the masts. Cut a hole through the rail at the bow for the jib-boom, which projects eight inches, and nail it to the deck with small brads, so that the outer end is about two inches higher than the inner.

Put in place the ropes which hold the jib-

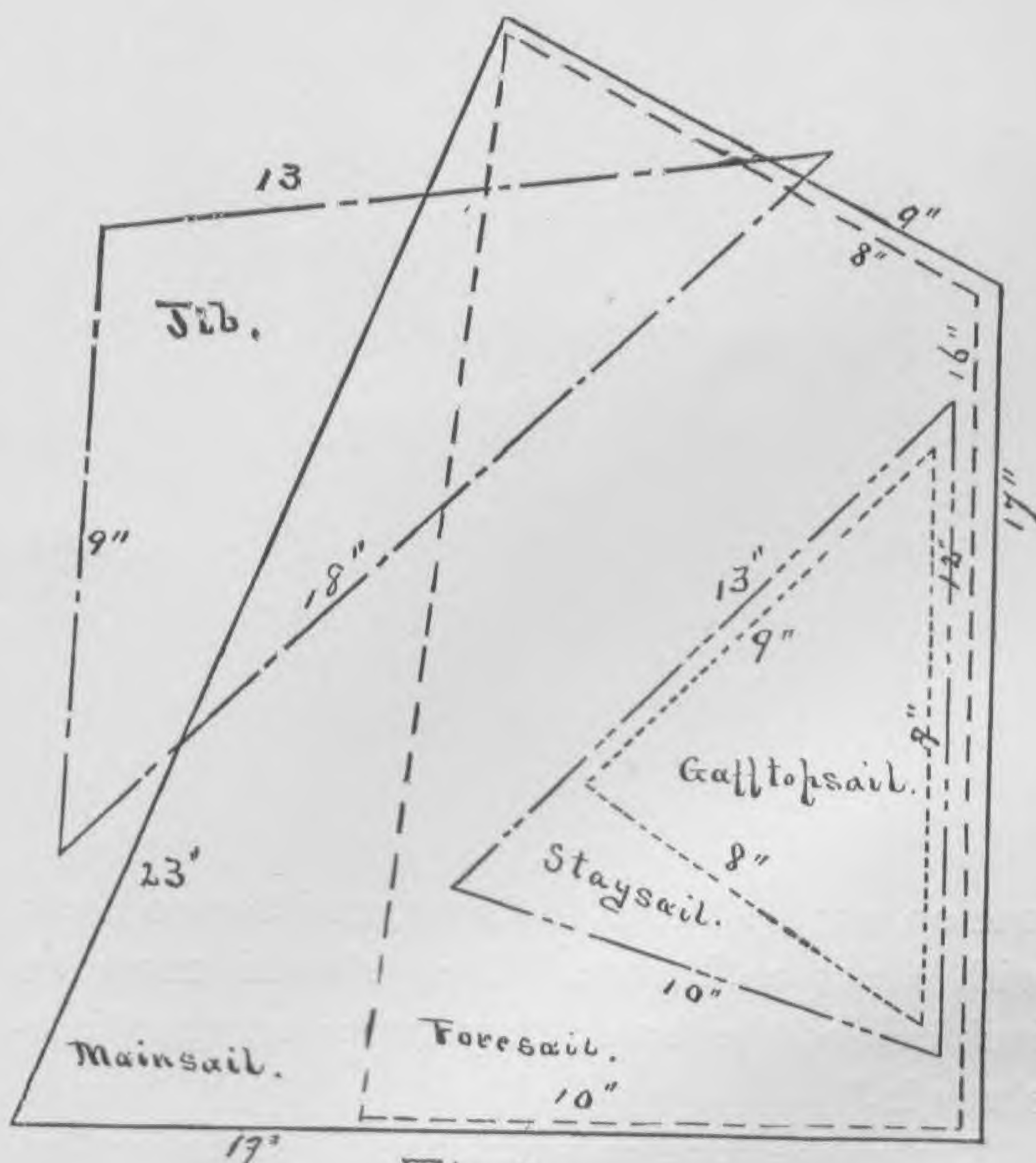


Fig. 2.

boom, the side ones called by the sailors the "jib-boom shrouds," the under ones called the "bob-stays." These ropes, made from fish line, are tied to the end of the boom, and fastened

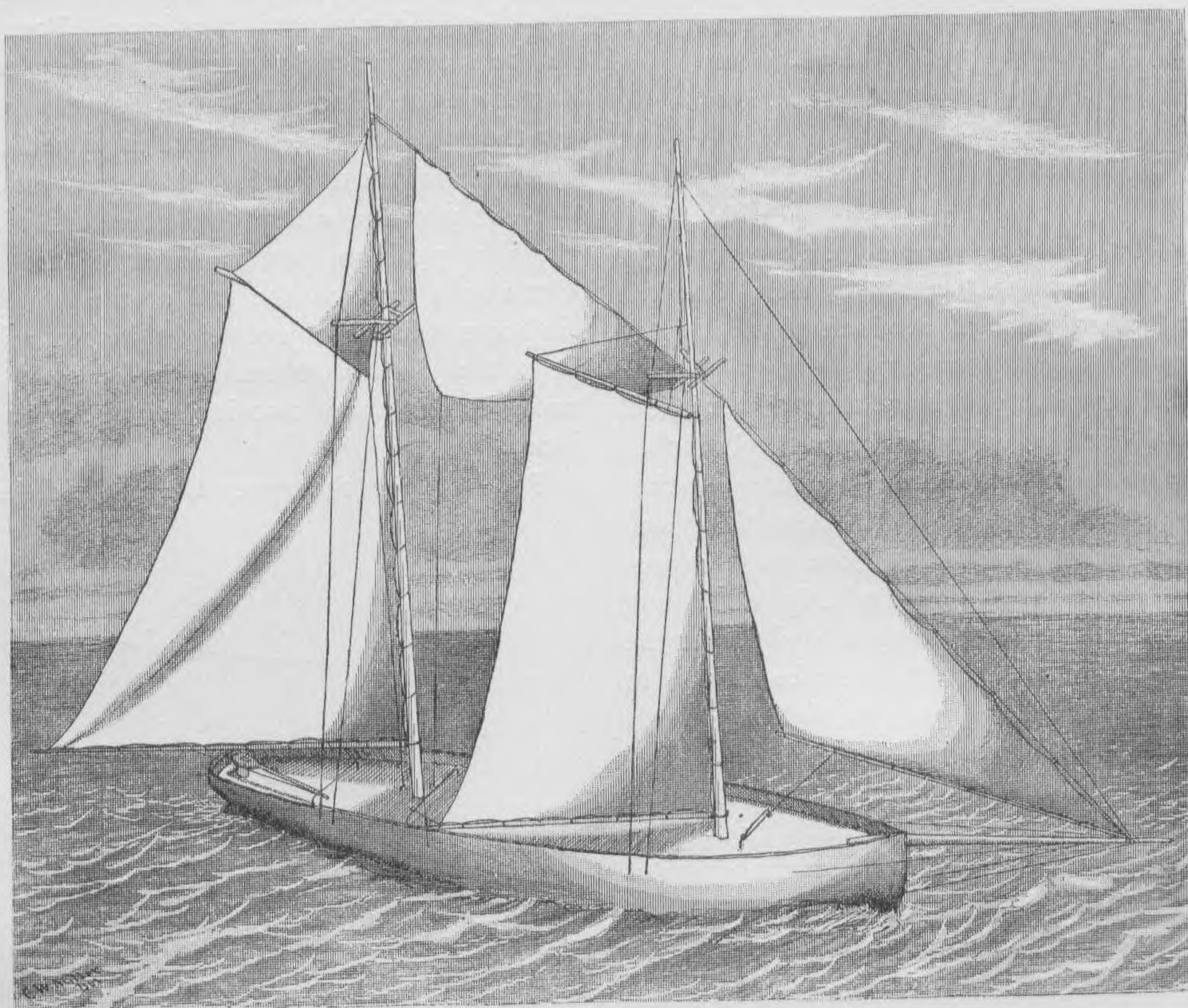
* See December WIDE AWAKE.

to the hull by winding the line around the head of a tack and then driving it in flush.

Place the foremast (thirty inches long) in its hole, and wedge it upright. Put the fore-boom over the mast, and let it slide down to the deck. Then slip on six or eight curtain rings of a suitable size, and on top of them the gaff. Make a pencil mark twenty inches from the deck and tie a piece of the line firmly to the mast at that point, bring the two ends down

in the spreaders, and fasten them just behind the shrouds. Also the "fore topmast-stay," running down to the end of the jib-boom. The position of all these ropes may be seen in the picture. Rig the mainmast exactly as the foremast, except that the top is an inch higher.

Get a piece of old soft cotton cloth, and cut out the sails shown in *Fig. 2* (the numbers show the length of the sides in inches). Sew the mainsail and foresail to the rings on the mast,



"SEE HOW SHE WORKS!"

one on each side of the boat, and fasten them with tacks as before. They should come an inch behind the mast; they are called the "fore-shrouds."

Rig up the rope on which the jib slides, called the "jibstay" or "forestay," placing six of the smallest rings on it. Put one of the tops over the mast; the hole in it should be of such a size that it can just slip down to the pencil mark. Rig the "topmast back-stays" running from the top of the mast down through the hole

and make loops on the top and bottom for the booms to pass through, and arrange the other sails as shown in the picture. The sheets are brought to the rings of the travelers and tied there. The mainsheet is tied to the tiller. A little study of the picture will make all these details clear. The sails may be furled by loosening, and sliding them down the mast or stay, and tying them up with the sheet.

You will need to take the boat down to the pond, and try it yourself first, because the length

of the sheets on the jib, foresail and mainsail must be adjusted, in order to make the boat work nicely. The jib-sheet wants to be as short as possible, so as to help the boat come around, and the sheets of the mainsail need to be rather short also. Now start off the schooner and see how she works. If she does not come around quick enough, shorten the jib-sheet, increase the size of the rudder, or move the traveler over the tiller further back, so that the rudder is turned more sharply. If she comes around too quick, reverse the above directions, *i. e.*, lengthen the sheets, move the traveler forward, or whittle off the rudder. These three parts control the movements of the vessel, and it is only neces-

sary to adjust them to make the boat a success.

I spoke of making a "long and a short leg." This is done by simply moving the traveler to one side, so that the tiller may go further to one side than the other.

The explanation of the movements of the boat is very simple. When she starts off, say on the "port tack," the mainsail sheet pulls the tiller "down" so that when she has gone a short distance and moves fast enough the bow is "thrown up into the wind," the boat comes around, the jib fills and starts her off. Then the mainsail and other sails fill, and the tiller is again drawn down, and the operation repeated, except that the boat is on the other tack.

Henry Mann.

THE ORLOFF.

(Stories about Famous Precious Stones.)

"Diamonds," says an old writer, "have ever been highly valued by princes. To a sovereign," he argues, "who can command the lives and property of his subjects by a word, the ordinary objects of human desire soon lose that stimulating interest which rarity of occurrence and difficulty of acquisition can alone keep. The gratification of the senses and of unrestricted sway soon palls upon the appetite, and War and Diamonds are the only objects that engross the attention; the former because it is attended with some hazard and is the only kind of gambling in which the stake is sufficiently exciting to banish the ennui of an illiterate despot; the latter because the excessive rarity of large and at the same time perfect specimens of this gem supplies a perpetual object of desire while each new acquisition feeds the complacent vanity of the possessor."

ACCORDING to this philosophy we should expect to find that the most despotic princes would be the most addicted to the vanities of War and Diamonds. Whether this conclusion be true as regards War may be open to doubt. Russia, without contention, is the most despotic monarchy of Europe, and yet the one which can show the shortest list of wars. With regard to Diamonds however the deduction holds in all its force. The Russian regalia is richer in precious stones than that of any other

Asiatic country. Besides numberless sapphires, rubies and pearls it possesses an immense quantity of diamonds.

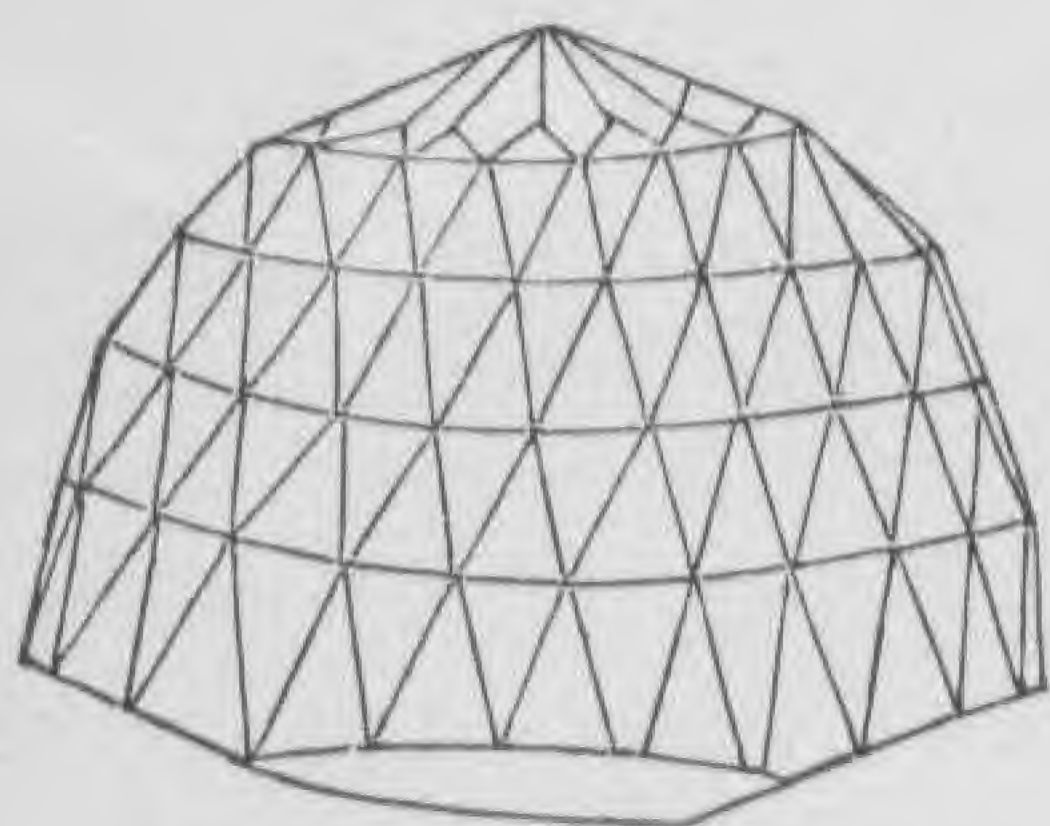
This passion for gems which characterizes the Russians was early observable among them. It is no doubt an inherited Asiatic taste, brought with them from the steppes of Siberia and the plains of Thibet, just as they brought thence their high cheek-bones, their flat noses, their dull skins, and the strong tendency to long hair and flowing beards.

As early as the time of Peter the Great the diamonds were a notable feature of the Russian crown. But it was in the reign of Catharine II. that the most splendid gems which Russia now possesses were added to her treasures. First and foremost stands the Orloff. With the exception of the very dubious Braganza of Portugal the Orloff is the largest diamond in Europe. It outweighs the Regent by more than half a hundred carats, reaching as it does the astonishing weight of one hundred and ninety-three carats.

The origin of this gem is absolutely lost and its early history is involved in obscurity and contradiction. It appears a stone of ancient

date. It was known in India for generations before it was transferred to Europe. Three Fates—a slave, a ship captain, and a Jew—seem destined to preside over the advent of each great diamond into our Western world. Nor were they wanting in this instance—except that a soldier was substitute for the slave.

The date, however, is not so easy to discover as the circumstances of its entrance into European history. It was, at all events, at some time prior to 1776 that a grenadier belonging to the French army which garrisoned the French possessions of Pondicherry deserted from his flag and became a Hindoo. This conversion was not the result of deep inward conviction, but of far-sighted craft. The Frenchman had heard of the great Sringeri-matha, the most holy



THE ORLOFF.

spot in all Mysore. This temple, situated on an island at the junction of the Cavery and the Coleroon, was one of four especially sanctified monasteries founded in the eighth century by Sankarā-

cārya. This man, a strict Brahmin, restored the glories of the old religion somewhat dimmed by Buddhism, and planted a monastery in each of the four extremities of India to keep alive the faith of Brahma. The one at Srirangam was noted, and the resort of pilgrims. It consisted of seven distinct inclosures, many lofty towers, and a gilded cupola, besides which it was furnished with a perfect undergrowth of dwellings for the many Brahmins who served at the altar.

Now the object of the grenadier's metamorphosis was that he might be received into these sacred precincts and become a priest of Brahma. And why? Because Brahma had a diamond eye. As the French historian puts it, "the soldier had become enamored of the beautiful eyes of the deity." European heretics were not allowed to penetrate further than the fourth inclosure. If the grenadier was to gaze at the eye of the god it must be as a Hindoo.

Being, then, externally a Hindoo, the Frenchman proceeded to gain the confidence, and even the admiration of the priests by the ex-

traordinary fervor of his devotion. The ruse succeeded, and he was eventually appointed guardian of the innermost shrine.

One night, on the occasion of a great storm, the Hindoo-grenadier believed the moment propitious for his grand enterprise. Being alone with the god he threw off his disguise, climbed up the statue, gouged out the Wonderful Eye, and made off with it to Trichinopoly.

Here he was safe for the moment among the English troops encamped at that place. But soon he journeyed on to Madras in search of a purchaser for the Eye. He of course met an English sea-captain, the middle figure of the indispensable trio of Fates, and to him the grenadier sold the diamond for two thousand pounds (\$10,000). After this the grenadier falls back into obscurity.

The sea-captain went to London and there speedily fell in with the Jew, the third Fate. The name of this Fate was Khojeh Raphael, and his character was that of "a complete old scoundrel." He seems to have traveled all over Europe in his character of Jew and merchant and to have left a not altogether immaculate record of himself. Khojeh Raphael paid twelve thousand pounds (\$60,000) for the stone and then in his turn set about hunting up a purchaser. But this proved no easy matter. The splendid Catharine of Russia, it is said, rejected it though fond of diamonds and not slow to spend money, because the price asked was too high for her. It remained for a subject to buy it and present it to her as a gift. This then is the history of the Orloff diamond in India according to the most trustworthy accounts.

Having brought the diamond to Europe we no longer deal vaguely, but are instantly face to face with an exact date.

"We learn from Amsterdam that Prince Orloff made but one day's stay in that city where he bought a very large brilliant for the Empress his sovereign, for which he paid to a Persian merchant the sum of 1,400,000 florins Dutch money."

So says a gossip letter dated January 2, 1776; and as further we are informed of the value of the "florins Dutch money" in English pennies, we learn that the price paid to the "complete old scoundrel" of a Khojeh Raphael

was one hundred thousand pounds (\$500,000). The Prince Orloff mentioned in the letter is no other than Gregory, the favorite of Catharine II., a man of such singular fortunes that a few words may well be spared to him.

Orloff's grandfather first came into notice in an extraordinary manner. In 1698, when Peter the Great barely escaped assassination at the hands of his body-guard, the renowned Strelitz, he resolved to destroy the corps altogether. This he performed effectually by cutting off their heads by scores and hundreds. The Czar aided in this bloody work with his own hand and decapitated many of his mutinous soldiers on a big log of wood. One young fellow, Jan nicknamed Orell (eagle), annoyed at finding the severed head of a comrade exactly in the spot where he had decided to lay his own neck, kicked it aside with the remark, "If this is my place I want more room." The Czar, delighted with the congenial brutality of the observation, pardoned the soldier and gave him a post in his new regiment of guards.

Slightly altering his nickname "Orell" into "Orloff," the respited victim founded a family destined to become renowned in Russian history. His son was taken into the ranks of the nobles, and his famous grandson Gregory, born in 1734, became a soldier early in life. Gregory Orloff was a man of ability, but his fortune was undoubtedly due to his personal beauty. He was tall and handsome with a well-earned reputation for audacious courage, always alluring to the mind of a woman. His first appearance in the world of fashion reflects little credit upon him and still less upon the Russian society in which he lived. He was on the point of being sent to Siberia to think over his misdeeds at his leisure, when a hand was extended to him which afterward raised him almost to the summit of human greatness. The Grand Duchess Catharine interested herself on his behalf and rescued him from Siberia. Orloff rapidly advanced in her favor, and it may have been he who first inspired her with the boundless ambition which he afterwards aided her in gratifying.

At all events Gregory Orloff and his brothers were the prime movers in that military insurrection which overthrew Peter III., a feeble, drunken imbecile, and set up in his place his

wife Catharine, a handsome imperious strong-willed woman. The revolt took place on July 9, 1762, and the new Empress instantly ordered her vanquished husband into confinement. Let us trust that she ordered not his death. Catharine II., often called the Great, and sometimes the Holy, has enough for which to answer without the addition of the deliberate murder of her husband to swell the account against her. Be this as it may, the fact remains that a fortnight later Peter III. was strangled by Alexèy Orloff, brother of Gregory the favorite of Catharine.

Thus left in undisturbed possession of the throne the Czarina loaded with riches and titles the brothers who had aided her. But nothing was sufficient for the ambition of Gregory Orloff. Not content with the position of First Subject he aspired to that of Master. Catharine, who seemed unable to refuse him anything, was several times on the point of recognizing him officially as her husband, and he had reason to suppose himself on the verge of grasping the great prize of his ambition when it was snatched away.

In 1772, being then absent upon a mission to the Turks, Orloff's credit with Catharine was utterly destroyed by his rival Potemkin. Hurrying back in such desperate haste that he had not a coat for which to change his traveling cloak, in hopes of repairing his evil fortunes, Orloff was met by an order to travel abroad. It was thus that Catharine always relieved herself of the presence of favorites whose company had become irksome.

Orloff, maddened with rage, set out on his travels and wandered all over the north of Europe. It was during his exile that he heard of the wonderful diamond that Khojeh Raphael had for sale. Knowing how fond Catharine was of all jewels and especially of diamonds, he hoped to propitiate her by a unique gift of the kind. Catharine took the gift, but refused to receive the giver back into her favor. Her fickle affections were engaged by another handsome face, and Gregory Orloff spent the remaining years of his life in aimless journeyings varied by an occasional visit to St. Petersburg. He died mad in 1783. He used sometimes to address the Empress, calling upon her by the pet-name of "Katchen"; or again he would taunt her with her unkindness.

Such was the life and death of Gregory Orloff. The diamond to which his name was given although accepted by Catharine seems not to have been worn by her as a personal ornament. It was mounted in the Imperial Sceptre where it has ever since remained undisturbed. In its latter state of tranquil splendor it differs signally from the Regent whose European career, as we have seen, has been a singularly stormy one. As the sceptre is used only at coronations the history of the Orloff becomes one of long repose and seclusion, diversified by transient re-entrances into grandeur as successive Czars appear upon the scene to be crowned.

The most singular coronation which has ever been performed was probably that which followed the death of Catharine and preceded the consecration of her son and successor. Catharine died in 1797 after a reign of thirty-five years. But before she could be buried there was a ceremony to be performed, the like of which had never been seen.

Her son Paul, a taciturn individual who seems never to have forgotten his father's miserable death, performed an expiatory coronation in his honor, seeing that that ceremony had been neglected in Peter's life. For this purpose the body of the long-dead Czar was disinterred and was dressed in the Imperial robes. The ornaments of the coronation which had been fetched expressly from Moscow for the purpose were then disposed about the mouldering figure. It must have been a grisly sight—the crowned skeleton of the murdered Peter lying beside his wife's body with Orloff's diamond banefully glittering on his bony hand. Nor was this all. With a genius for grim appropriateness the new Czar summoned the two surviving murderers of his father to attend as chief mourners. These were Prince Baratinsky and Alexèy Orloff. The former overcome by the horror of his recollections fainted away many times; but Orloff, with iron indifference, stood four hours bearing the pall of the man he had strangled with his own hands thirty-five years before. After performing this public penance both men were banished from Russia.

The coronation of a sovereign is always a stately ceremony; but the installation of the

Czars of Russia is elaborate almost beyond description. The ceremonial invariably followed is that used at the coronation of Peter the Great and his Empress. The ritual is largely religious, as the Czar is Head of the Church as well as Emperor. The sceptre of course plays an important part and is taken up and put down a bewildering number of times. The following extract from a work entirely devoted to the explanation of the many comings and goings and uprisings and downsittings will give a slight idea of what a performance the coronation is:

"The Metropolitan having received the Sceptre from the hands of the noble bearer carries it to the Emperor who takes it in his right hand. The Metropolitan says, 'Most pious, most powerful, and very great Emperor of all the Russias, whom God has crowned, upon whom God has shed His gifts and His Grace, receive the Sceptre and the Globe. They are the symbols of the supreme power which the Most High has given thee over thy peoples, that thou mayest govern them and obtain for them all the happiness they desire.' And the Emperor takes the Sceptre and sits upon the throne."

But this is not nearly all. The sceptre, which is graphically if somewhat grotesquely called the Triumph-stick, is held only for a brief time. The Emperor at the end of the prayer, lays it upon a velvet cushion and upon another he places the globe or Empire-apple as it is termed. Then he calls to himself the Czarina and crowns her with his own imperial diadem. But the consort is not invested with any imperial power, therefore she does not receive either the sceptre or the globe. After having crowned his wife, the Czar again seats himself upon his throne holding his Stick and his Apple in either hand. Cannons roar, bells clang and multitudes shout "Long live the Father!" while all present bow low before the monarch in adoration. Then the new Czar and Czarina receive the communion with more stately movings about from place to place. Finally the *Te Deum* is sung, the crowned Emperor, sceptre in hand, walks forth, and the intricate ceremonial is thus brought to a close, having been in continuance some four or five hours.

The Regalia, which includes seven or eight crowns, is kept in the Kremlin in an upper room "where," says a traveller, "they [the crowns, etc.] look very fine on velvet cushions

under glass cases." The Czars are always crowned in Moscow, the ancient capital of Russia.

Paul, having performed the weird ceremony already described, then had himself duly and solemnly crowned. His reign was a short one however, and in 1801 he gave place to his successor Alexander, in the orthodox Russian manner—that is to say he was strangled.

In 1812 the Orloff and its magnificent companions had to fly from Moscow. In the beginning of September in that terrible year, finding that the mountains of slain on the bloody field of Borodino could not stop Napoleon, the Russians sullenly retired before him. On the third of the month the Regalia was carried out of Moscow and lodged in a place of safety in the interior. This flight was followed by that of everybody and everything that was portable. When Napoleon entered on the fourteenth it was to find an absolute desert in Moscow, only a few stragglers, prisoners and beggars having been left.

Alexander I., strange to say, died peacefully in 1826, leaving the throne to his brother Nicholas. Nicholas has been aptly called "the Iron Czar." He was the third son of his father, but his elder brother, Constantine, having no taste for the perilous glory of a crown renounced his rights in favor of Nicholas. There was some delay in crowning the new Czar owing, says the Court Circular with decorous gravity, to the illness and death of the late Emperor's widow who survived her husband but five months. In reality, however, the delay was caused by events more serious to the peace of mind of the new sovereign. A revolution, which seems an indispensable accompaniment to a change of rulers in Russia, exploded after the accession of Nicholas and came near to costing him his life. This event seems to have further hardened a nature that was already sufficiently severe, and when Nicholas went to Moscow in August, 1826, his coronation progress was not meant to gladden the people but to make them quake. When the Czar left the Cathedral of the Assumption, his crown upon his head and his sceptre in his hand, "his face looked as hard as Siberian ice." So wrote of him an eyewitness, who further says the people were too

frightened to cheer—they dropped on their knees with their faces in the dust. It was a gloomy coronation notwithstanding all the diamonds and glitter of the pageant. There was but one redeeming incident that spoke of human kindness and affection. When the Czar had been crowned his mother, the widow of the murdered Paul, advanced to do homage to him as her sovereign, but the Czar knelt before his mother and implored her blessing. After the Empress Mother came Constantine, the elder brother, who had waived his rights to the crown, and he was in turn affectionately embraced by Nicholas. This exhibition of fraternal affection in Russia, where brothers had been known to strangle each other in order to grasp the much-coveted sceptre, was considered as something quite unprecedented. The Court Chronicler of the day speaks of it with emotion as a sight to move the hearts of gods and men.

Nicholas died in the middle of the Crimean War and Alexander II. reigned in his stead. The extraordinary pomp of his coronation has never been surpassed. He in his turn held in his hand Orloff's great diamond as the symbol of absolute power. Yet he, who could deal as he chose with the lives of all his subjects, had not power to save his own from the hand of the assassin. The murder of Alexander II. by Nihilists in March, 1881, is fresh in memory as also the succession of the present Czar. The Orloff was then once more taken from its repose in the sumptuous privacy of the Kremlin to enhance the splendors of an Imperial Coronation. Within the past year the Orloff has served to grace yet another splendid ceremony. On the occasion of the recent installation of the Czarevitch as Hetman of the Don Cossacks, the sceptre as well as the crown and globe, were exhibited to the admiring multitudes of Novo Tcherkask.

Such is the career of the imperial diamond given by Gregory Orloff to his Empress. In appearance the gem differs materially from the Regent. It is essentially an Asiatic stone, presenting all the peculiarities of its Eastern birthplace. It is variously described as of about the size of a pigeon's egg or of a walnut. One writer expresses disappointment at it, remarking that the sceptre resembles a gold poker,

and the Mountain of Light (a name sometimes given to the Orloff) "which we had pictured to ourselves as big as a walnut was no larger than a hazel-nut!" Never having seen this diamond the present writer cannot speak of its apparent size, but if the drawings inspected may be relied upon it is certainly a monstrous "hazel-nut" of a diamond.

The cutting of the Orloff is purely in the Eastern style, being what is known as an Indian rose. Asiatic amateurs have always prized size above everything in their gems. The lapidaries therefore treat each stone confided to them with this object mainly in view. A stone is accordingly covered with as many small facets as its shape will allow, and no attempt at a mathe-

matical figure, such as that presented by our European diamonds, is ever ventured upon by them. Cardinal Mazarin was the first who intrusted his Indian rose-diamonds to the hands of European cutters in order to have them shaped into brilliants. The fashion thus set by him has been generally followed throughout Western Europe. Russia, however, true to her Asiatic traditions, keeps to Indian roses, most of her imperial diamonds being of that cut.

The Orloff is now back again safe in the Kremlin, where let us hope it may long rest undisturbed either by rumors of invasion or a demand for a new coronation with its probable attendant assassination, universal terror and judiciary retribution.

Mrs. Goddard Orpen.

A QUEER BUNDLE OF STICKS.

(A Long Line of Hills.)



FOSSIL ELEPHANT'S
TOOTH.

*(Side view. Found in
Nebraska.)*

ONE day last summer "Little John" and I took a steamer from Chautauqua and rode sixteen miles down the Lake. It was a warm day and we sat on the deck to catch the breeze. We rode past Long Point with its baby menagerie and tried to see the animals as we passed. We could just see the lion and the tiger in their cages and as we drew up to the dock the lame camel limped down to the water's edge to drink. Back among the trees we saw the old elephant uneasily swaying himself and swinging his trunk to and fro. Some deer were cropping grass near him. It was a queer scene for New York State and I could not but feel that the elephant was out of place in that grove and the camel at the Lake's edge a very unnatural feature. If the elephant had been crushing his way through a sparse forest of tropical trees or

rushing through a jungle of high grass, and if the camel had been coursing over a sandy desert, I would have felt that there was harmony.

But the boat went on and left the camel and other animals behind us and steamed down the Lake. We passed through the "Narrows," the place which led the Indians to call the Lake — "Chautauqua." The word means "a bag tied at the middle," and the Lake is narrow at the middle and bulging at the ends like such a bag. Presently we saw the foot of the Lake and the low, flat, swampy land there.

The Lake is growing smaller century after century. One time, when the water stood at its old high level, this low, flat, marshy land was lake-bottom and deep water covered it. If we dig down into the swamp land we find "shell-marl" there. Shell-marl is a whitish mud made of the shells of snails. It sometimes gathers, very slowly, in quiet bays or arms of lakes. Over this marl we find a very black "muck" or "swamp dirt."

These two layers—the shell-marl and the muck—tell us a story of the past. As long as

the water was quiet and fairly deep the shell-marl accumulated. Hundreds and thousands of snails lived and died and gave their shells to make it. But the Lake was draining slowly and the water shallowed. Water-loving plants that lived near the edge began to encroach upon the Lakelet.



MASTODON'S TOOTH.

(Side view. Found in New Hampshire.)

What had been open water with abundant pond-life began to be swamp. The plants died and the parts under water slowly decayed and left much of their material as muck or black dirt. The water continued to fall and the

plants to encroach until what had been an arm of the Lake became flat lowland with marshy spots here and there.

But steamboats do not wait for people to think long of the far-away past and we whirled into the outlet where were new things at every turn to attract our attention, and at last we drew up at the dock in Jamestown. We climbed up one of the big glacial hills and hurried down town, for we had not much time. I wanted to see a queer bundle of sticks, of which I had been told. They were at the High School building and Prof. Love showed them to us. There were not many, perhaps a dozen little sticks not larger around than a lead pencil, nor more than a few inches in length. They were in a bottle. They were rough and black and very tender. I think they were a sort of spruce, though they are so old and rotten that it is not easy to tell.

It doesn't seem as if that was much to see, does it?

They interested me greatly however, and I looked at them carefully. They are all that is left of a breakfast eaten hundreds and thousands of years ago. A few years since some men were digging a ditch in the low swampy land near the foot of the Lake. Suddenly they struck against something hard and, lo! a piece of bone. Later people from Jamestown went out to see what had been found. Digging away the muck carefully other bones were uncovered, and teeth.

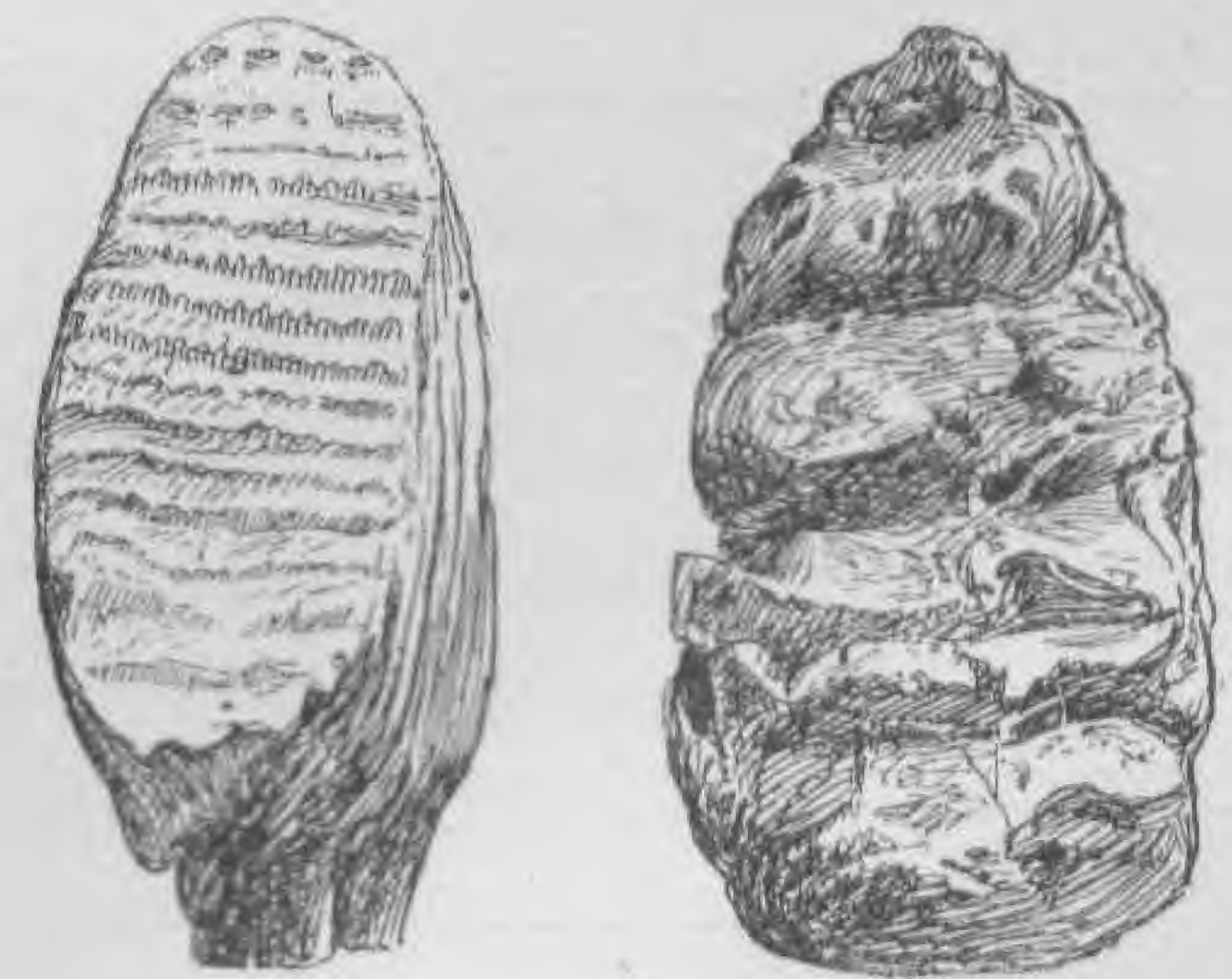
Most curious however was this: between the ribs of the great animal whose bones were there, just where its stomach should be, was a pile of sticks, perhaps half a bushel of them altogether. We can explain the matter simply. I think the animal had been browsing in a spruce woods. He had made a full meal and his stomach was filled with bits of branches. He went to the nearest swamp to get a drink of water after his breakfast and mired in the soft muck or in a quicksand. Deeper and deeper he sank. He screamed forth fearful cries, but there was no one to help him. Down he went. At last he became quiet and disappeared completely in the soft mass. Ages perhaps have passed since then, and to-day all that is left to tell the story of the unfortunate monster are a few bones, some teeth and the bunch of spruce sticks.

Study of these bones and teeth show us that the animal here buried was a mastodon, a great, massive beast shaped like an elephant and with a long trunk and a pair of ivory tusks. If you and I had seen him we would certainly have called him an elephant.

His teeth, however, are not like those of an elephant. They are not flat grinders. They have long fangs below by which they were rooted into the jaws and the crown is raised into peaks with valleys between. The whole crown too is covered with a coat of enamel which generally is well preserved. They are so large that a single tooth some-

times weighs several pounds. The tooth of an elephant is of a different shape. The part in the jaw is not made into long fangs or roots, but is one solid mass.

The crown is not covered with enamel, but has this material curiously arranged in the midst of the softer tooth matter or dentine. The surface for chewing is almost flat, being only a little roughened by transverse

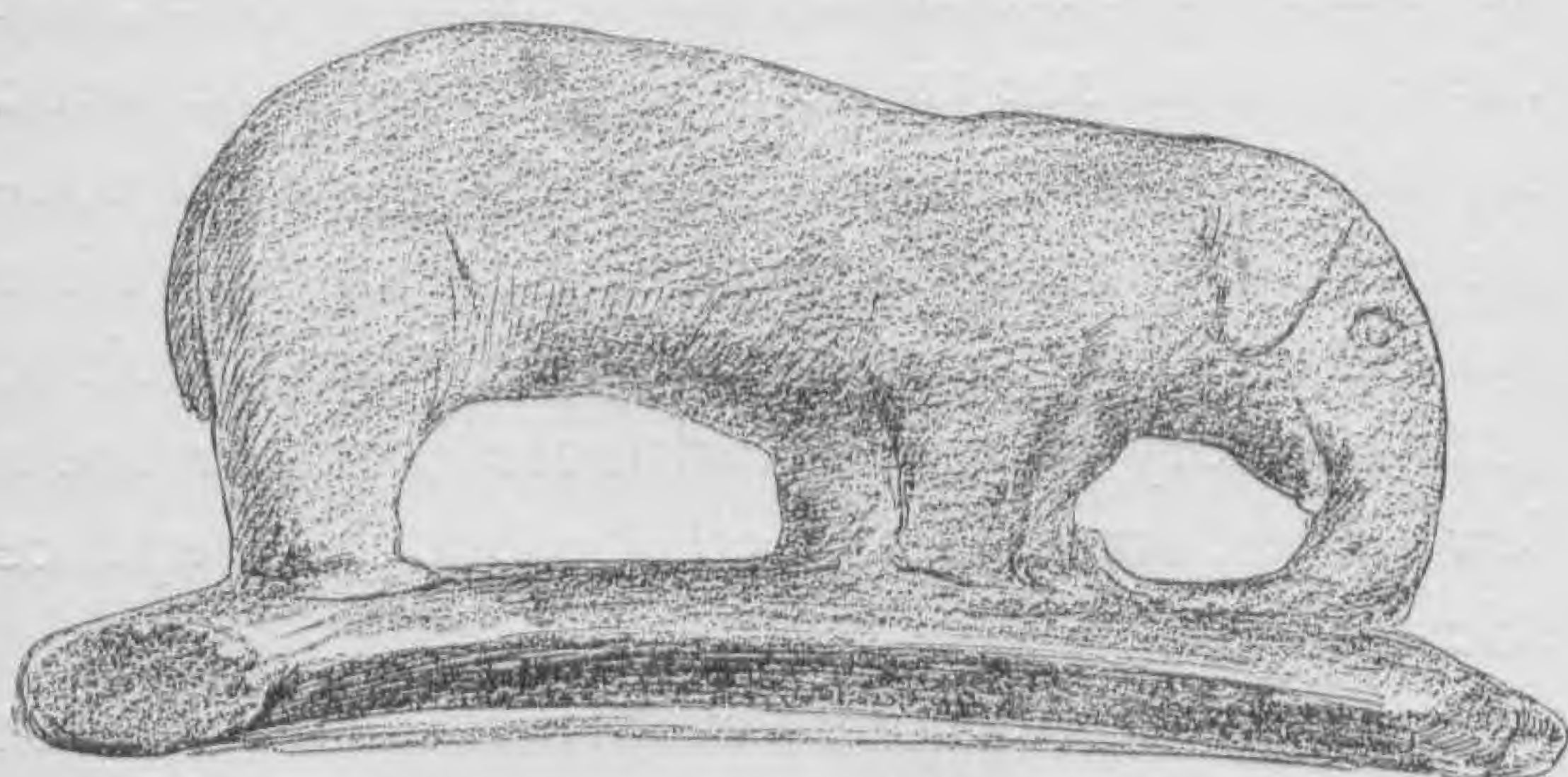


TOOTH OF FOSSIL ELEPHANT, AND OF MASTODON.

(View from above, showing difference in grinding surface, due to different arrangement of enamel and dentine.)

lines of enamel which project a little above it. The arrangement of the enamel is this: Suppose we had a number of tubes made of enamel; fill them with dentine and then crush them until nearly flat; then set them up, side by side, flat to flat with enough dentine between them to bind them all in one mass. We would now have an arrangement similar to that in the elephant's tooth.

The Jamestown mastodon is not the only one known. A nearly perfect skeleton was found



PIPE REPRESENTING AN ELEPHANT.

(From mound in Iowa.)

many years ago at Newburg, N. Y., and with it were found a lot of pine or spruce twigs—the remains of its last meal. Teeth, bones and tusks are turned out now and then all over the United States. Not only so, but teeth and bones of true elephants are also found. Sometimes these are in old swamp bottoms, sometimes in river sands, sometimes in pot holes filled with gravel, but they all show this—there was a time when elephants and mastodons roamed over the United States. Could we visit the Chautauqua Lake of that old time, we might hear the trees crushed under the tread of troops of mastodons as they came at evening to Long Point to drink. We might see them bathing and frolicking in the water or we might watch them browse upon the twigs of spruce-trees as they tramped heavily away.

One of the strangest things about these elephants was, that they were covered with hair. One famous specimen, of which doubtless you have read, was found in Siberia* many years ago inclosed in solid ice. He was not surprised by a treacherous bog and engulfed, but he may have been surprised by heavy snow, overwhelmed, buried and entombed finally in an ice mass.

* See picture of head of Siberian mammoth, page 84, WIDE AWAKE (C. Y. F. R. U.), April, 1887.

Or it may be that that happened to him which Sir Charles Lyell tells of some unfortunate animals. He speaks of a line of either musk oxen or reindeer, who were frozen stiff and solid while they were swimming across a Siberian river. I suppose that very quiet water may sometimes be a trifle colder than freezing and yet not freeze. If now something set the water in motion it will freeze rapidly, almost instantly. A similar thing may have happened to this woolly elephant. When spring came, and the rivers flowing north were flooded, the great ice cakes with these giant carcasses frozen in them were carried to the Northern Sea. In that cold, cold land the ice blocks have never melted and the entombed animals have been preserved hundreds of years until now.

However he was surprised, the Siberian elephant in question was wonderfully preserved, almost entire. He is described thus: "The head was still covered with skin. The brain remained in the skull, but was somewhat dry. The eyes remained in the sockets and had lost little except their lustre. One ear was entire and was furnished with tufts of hairs. The skin—dark gray in color—was furnished with bristle-like hairs from four to eighteen inches long; another covering of thick-set hairs four inches long and filling between the intervals of the hairs a coat of wool. On the neck was a long and shaggy mane."

I don't know whether the mastodon was so heavily clothed with hair, but some tufts have been found with skeletons, so he had a coat.

I think we may be so much impressed by these gigantic beasts as to lose sight of the fact that many other strange and curious forms lived in our land at the same time. To-day in Texas and Mexico there lives a little wild pig called a peccary. They are very fierce, and large droves run wild over the country. They will boldly attack a man and are foes not to be despised. When elephants and mastodons roamed over this country, droves of peccaries ran through the woods. Forty skeletons of them were found in one place near Columbus, Ohio. It looks much as if they had run into more dangerous place, a quicksand or a pitch-hole, and all been killed.

In the marshes near my old home in New York State, some men, years ago, found the

remains of a great beaver-like animal. This is sometimes called the "giant beaver," but it is better to call it by its name "Castoroides" as it was not a true beaver. It was as large as a black bear and lived in most parts of the United States. Its great chisel-like front teeth would cut trees just as those of the beaver do now, though on account of their size and power they would work more rapidly.

At that same time lived a great buffalo or bison, horses larger than live now, a gigantic stag, tapirs and several kinds of large sloth-like animals. Their remains are found in caves, in fissures in rocks, in swamp beds, in river deposits, here and there, all over this Continent. Many animals like to go to salt springs, or "licks" as they are called, to taste the salt of which they are fond. These old-time giant beasts were just as fond of salt as our modern kinds and in Kentucky there is a lick called "Big-bone Lick" because of the great number of bones of these huge forms found there.

When was all this? I don't know exactly, but it was not so long ago as the time of the Glaciers, when our Long Line of Hills was made. There were mastodons before that, but those of which I have spoken all lived later. I do not know whether men lived in America at that time, but I am sure they did in Europe, and that they saw the old woolly elephants or mammoths. They were quite wild rude men. They lived in caves and led a roving hunting life something like our American Indians. I think in winter they clothed themselves in the skins of animals that they killed with their hard and heavy clubs or shot with their flint-tipped arrows. They were fond of carving all sorts of things in bone. I suppose many a time at night, around the fire kindled at the mouth of the cavern for warmth and protection against wild animals, these men, tired with the day's hunt, would talk with their family and sit carving bones with stone knives into different kinds of tools and decorating them with pictures of the animals they had killed on their hunting trips. However that may be — among the many pieces of bone carved into various forms and with pictures rudely but boldly scratched upon them, has been found one piece of mammoth ivory with

a picture of the old-time woolly elephant dug into it. It is better done than you or I can do, and there is no mistaking the animal.

There are some reasons for believing that even in this country men lived with the elephants and mastodons. The Indians tell some queer stories of a monstrous animal that has disappeared. David Cusick, an Indian who has written the *History of the Six Nations*, says:

"About this time Big Quisquiss [perhaps the Mammoth] invaded the settlements south of Ontario Lake: the furious animal push down the house and made a great disturbance: the people was compelled to flee from the terrible monster: the warriors made opposition but failed; at length a certain chief warrior collected the men from several towns — a severe engagement took place, at last the monster retired but the people could not remain long without being disturbed: Big Elk invaded the towns: the animal was furious and destroyed many persons: however the men were soon collected — a severe contest ensued and the monster was killed."

Now I do not think that too much ought to be made of Indian traditions, but several such stories are found among the Indian tribes and it may be they are founded on fact. Again, there have been reports of stone implements being found with mastodon bones. In perhaps all these cases there is some uncertainty in regard to the facts. Two curious stone pipes have been found in Iowa, which are of aboriginal manufacture probably, and which perhaps represent the elephant or mastodon. These are from mounds near the Mississippi, and if genuine show that the Indians had seen elephant-like animals. Some years ago the Smithsonian Institution published an article, with a picture, upon an "Elephant Mound" in Wisconsin. This was a mound of earth, shaped somewhat, in outline, like an elephant. If there really is such a mound it suggests that the Indians had seen the mastodon alive. I myself believe that some day the evidence of this will be conclusive. In fact I would not be very much surprised if the recent newspaper report of living mastodons in Alaska were true. When a species of animal becomes extinct, the process of extinction is a slow one and individuals may linger on in exceptionally favorable circumstances long after it has disappeared elsewhere.

Frederick Starr.

FROM THE HEGIRA TO MAHOMET'S DEATH.

(Search-Questions in Mahometan History.)

21. When did Mahomet enter Coba, a suburb of Medina?

22. Upon what work was Mahomet engaged during the first months of his residence at Medina?

23. By what name were the adherents of the prophet who had come from Mecca, distinguished?

24. What were the Medina converts called?

25. With what people did Mahomet enter into alliance on coming to Medina? Was the alliance of long duration?

26. What was the chief business of the people of Mecca?

27. What offensive operations were conducted by Mahomet against Mecca in the first year of the Hegira?

28. When was the battle of Bedr fought and of what importance was it in the progress of Mahometanism?

29. When was the first defeat of the Mahometans?

30. What great massacre followed the siege of Medina by the Meccans or Coreish?

31. Name some of the most important provisions of the treaty of Hodeibabia.

32. What event established the authority of Mahomet over all the Jewish tribes north of Medina?

33. On what occasion did the entire population of Mecca evacuate the city and encamp for three days on the hills about the city?

34. What event broke up the truce of Hodeibabia?

35. What very important result followed this?

36. What city besieged for a long time by Mahomet finally submitted to him after the siege had been raised for ten months?

37. Who was Mary, the Coptic Maid?

38. What three false prophets rose in rebel-

lion against the Mussulman yoke about the time of Mahomet's death?

39. What is the date of Mahomet's death?

40. Where was he buried?

ANSWERS TO NOVEMBER SEARCH-QUESTIONS.

221. Lucan.

222. Juvenal.

223. Martial.

224. Tacitus.

225. Suetonius.

226. Quintilian.

227. Seneca.

228. Pliny the Elder.

229. *The Meditations of Marcus Aurelius.*

230. Macrobius.

EARLY CHRISTIAN HISTORY OF THE EMPIRE.

231. Athanasius.

232. Arius.

233. St. Augustine.

234. St. Ambrose.

235. Hypatia. See Kingsley's *Hypatia*.

236. Nestorius, the Patriarch of Constantinople.

237. A Briton who came to Rome about 400 and taught certain doctrines afterwards condemned by several ecclesiastical councils. His followers were called Pelagians. The doctrine has sometimes been called Monophysite.

238. I. Nice 325.

II. Constantinople 381.

III. Ephesus 431.

IV. Chalcedon 451.

V. Constantinople 553.

VI. Constantinople 681.

239. Eutychianism, from Eutyches, an abbot of Constantinople, who declared in 446 that there is but one nature in Christ.

240. In 729.

Oscar Fay Adams.



SOME SIMPLE USES OF THE OVEN.

(Cooking in the Public Schools.)

A SHORT time since the mother of a poor family died. The father was a hard-working sober man, and there were three children, the oldest a bright girl of thirteen. She had been a pupil in the public cooking school for a year, and had been taught sewing ever since she entered the grammar department. When the mother died this young daughter stepped to the front, and took the housekeeping into her brave capable little hands. She kept the house tidy, the little children's clothes mended and clean, and she had always something well cooked for her father. She constantly surprised him with some special dish that was different from the ordinary food to which he was accustomed.

The father enjoyed it all, but he looked troubled and care-worn. One day, when she had cooked something particularly nice he praised it, then as if afraid of hurting her feelings he said, "I don't like to say anything, Mary, you are doing so nicely, but I am afraid we can't afford to have all these things. They are nice, but you must remember we are poor people."

Mary's hour of housekeeping triumph had come. "Indeed, father," she said, "it costs no more than the old way."

To prove it, she brought her little account-book, which she had kept very carefully, and showed him that she had not expended one cent over her allowance. The father was very proud and happy over his little daughter's achievement, and you may be sure he told all his acquaintances about it; and you may be sure also, that the industrial training in public schools has no more earnest advocate than this same man who has seen for himself the result of the training.

I tell this because it is always pleasant to know some of the practical good that comes of this kind of teaching, especially if you are inclined in any degree to advocate it. There will always be somebody sure to pop up and say, as so many do, "Yes, it is all very well to talk about the value of such training—but what has it ever done for anybody? We want the cold facts."

So here is one ready-made for use. It is not such a "cold" fact either, it is quite a heart-warming one.

Mary, with all the rest of the girls, learned how to make the fire, and to perform a housekeeper's duty. Next came a lesson in the simplest form of cooking—that of baking, or cooking by direct heat. The very first things the class was set to do was to bake potatoes, to prepare croûtons, and to brown bread-crumbs.

All this seems easy, doesn't it? Ah! but I would like to know how many of you can bake a potato perfectly, so that it shall be just mealy and white all through, with a crust that is not burned nor hardened. Tell me, now, are not the majority of baked potatoes that you see, brought to the table so shrivelled and dried-up that half the contents are wasted, and the residue soggy and heavy? If that is not your experience it is mine; and as I particularly like baked potatoes, I don't mind putting on cap and apron, and coming to the class, hoping to find out something that I didn't know before.

The fire is built—there are no directions this time, for the fire-maker is supposed to have learned all about it at the last lesson. A few questions are asked to the remainder of the class, and if anything is done in the wrong place, or is omitted, the correction or the sup-

plying the omission must come from the class. When the fire is built the lesson for the day begins.

The first step is baking without measurements or mixtures. Potatoes are cooked by themselves and do not require any combination with other ingredients. Select the potatoes of uniform size; that is so that all may be done at the same time. Should they vary in size, then some will be cooked before others, and these will burn or spoil while the others are cooking. Medium-sized potatoes are better for baking than either large or small. Having selected them, wash and scrub them well, so that the skins will be perfectly clean. Very many persons like to eat the skin of a baked potato, but it is not safe to do so unless you know they are thoroughly scrubbed, and are baked in a clean oven. That you must look out for as well. Do not place them directly upon the bottom of the oven, but upon the grate, which has been laid across the middle of the oven. The hot air gets all about them on every side, and they are cooked evenly. They must be baked until they are soft; this will take from half an hour to three quarters, according to the size of the potato, and the heat of the oven. When they are just done they will be plump, smooth and soft, and when opened they will be mealy. As soon as they are done break the skins to let the steam escape. It is this steam or gas that often makes a potato bitter when it is confined in the close skin for a long time, and it tends also to make the potato "soggy." Baked potatoes should be served at once, in an uncovered dish, as the steam that is generated in a covered dish will make them heavy. They can be warmed over as well as boiled potatoes; so if in cooking at home you have any left, peel them at once, as they will be in a better condition to warm over. No little thing betrays the unthrifty housekeeper more quickly than the habit of setting potatoes away unpeeled. Not only is much of the potato wasted when it is peeled after standing some time cold, but it cannot be prepared and served as daintily.

There is one thing that the school-training does, and that is to show girls the right way, and to prove that it is the best way. If only the girls who do not have the advantage of such training,

would take the hints that are given in these papers, they too might feel that they have achieved something, even without the school and the teacher. If a thing seems small to you, and of little significance, do not on that account neglect it, but remember that the sum of successful living is made up of an aggregate of trifles, and that each one must be scrupulously attended to, or the whole will go wrong. Isn't that a solemn sermon with a left-over baked potato for a text?

The next things are the croûtons. There is probably little need to explain that these are browned slices of bread to serve with soups or stews in place of toast. Sometimes they are fried, but now we are only just learning how to use the oven, and frying is ever so far away. The brown croûtons which the girls in the cooking class are preparing to make are very delicate and nice for the purpose for which they are used. The bread knives are got ready, the girls see that they are sharp, then slices half an inch thick are cut from the loaves of bread. The crusts are removed from these slices, and they are then cut into half-inch cakes, put into a shallow pan, set in the oven and baked until they are brown. But what becomes of the crusts? Are they thrown away? That would be waste, and waste is not tolerated in the class. Now is the time to give the first lesson in economy; in the thrift that made our grandmothers such wonderful housekeepers. And just here it is quite in order to say to the girls who are reading this, that the same use may be made of all bits of stale bread — no matter how small the pieces — that is being made of the crusts that were cut from the slices of bread for the croûtons. These are put into a pan and, when the oven is moderately hot so that there is no danger of the bread scorching, placed in the oven and heated until dry all through and crisp. Then remove the bread from the oven and roll it as fine as you possibly can. You will not be able to crush it uniformly, and some of the crumbs will be finer than the rest. It is best to separate the fine crumbs from the coarse, as they may be used advantageously for different purposes. To separate them, sift the crumbs, put the fine ones into one jar or bottle, the coarse ones into another, cork them and keep them in a dry

place. They will keep a long time, and be a great convenience as they will be always ready for use. What will be done with them, do you ask? Well, they will be used for breading veal, lamb chops, oysters, or anything that is to be cooked in crumbs with beaten egg. By and by, when we come to it, you will be told how you are to use them; in the meantime you close them tight and put them where they will keep dry.

You see you have learned the simplest form of cooking, in which you have been given your fire and a simple article of food with no combination of ingredients. Now comes the next step. This is also baking, but with a little lesson in measuring and in preparation. Before going to work at the cooking there are some things to be learned that will prove valuable to you as long as you shall be called upon to cook, and you will be glad that you have learned them when it shall become your turn to teach. For that is going to happen surely. I wonder how many of you girls have ever thought of this: that when you are learning anything it is not for yourself alone; but that by and by you will be obliged to impart what you know to some one else. That is why the thoughtful women, who have had this training in charge, have given so much care to the best way of teaching the pupils. I am sure you will all see before we finish, that the methods are as natural as those employed in any science, and that every step is taken with reference, not only to the one that preceded it, but to all that are to follow. A great deal of wisdom and experience has gone into the planning of the course of training, and it is as nearly perfect as it is possible to be at the present.

But what is it you are to learn? It is something about measurements. You may all imagine, if you like, that with caps and aprons on, you are standing before your table while the teacher tells you the important things for you to remember. They are these:

Accurate measurement is necessary to insure success in cooking.

All dry materials should be sifted before measuring.

A cup holding just half a pint is the standard measuring cup.

A cupful is all the cup will hold without running over — full to the brim. A scant cupful is within a quarter of an inch of the top.

A tablespoonful of flour, sugar and butter is a rounded spoonful.

A teaspoonful of salt, pepper and spice, is a level teaspoonful.

A heaped spoonful is all the spoon will hold.

Half a spoonful is measured by dividing through the middle — lengthwise.

A speck is what you can take on the tip of a penknife.

Now we may go on and try a little baking with some simple combination of ingredients. It shall be baked apples. For these you will use to each apple one teaspoonful of sugar, and one tablespoonful of water. Pick out nice fair apples, unspecked and of uniform size. Wipe them nicely with a clean, dry cloth, remove the cores, and put them in an earthen dish. Put the sugar in the centre of each apple, in the cavity whence you have removed the core, and the water in the dish. Bake in a hot oven from twenty to thirty minutes, or until soft, but not until broken.

This is a good time to learn to brown crackers to serve with soups or oyster stews. For this you will use one half a teaspoonful of butter to each whole cracker. Split round crackers in halves, spread the inside with a thin layer of butter. Put them, buttered side uppermost, into a pan, and brown in a hot oven. Serve at once, and they will be found delightfully sweet and crisp.

A nice lunch dish is made of these same crackers, by preparing them in the way just given, then for every cracker mix one tablespoonful of grated cheese, one half a salt-spoonful of salt and one quarter of a salt-spoonful of pepper. Spread the hot crackers with this mixture of cheese and seasoning, return to the oven, and warm until the cheese is melted. Or you may make a brewis for tea by preparing the crackers and cheese in this way, putting them into a shallow earthen dish, adding a quarter of a cup of milk to each cracker, and baking until it is brown, or until the milk is absorbed.

Now this is all very easy, but, I assure you, it is nice, and will give you a relish for tea or luncheon that is inexpensive and easily prepared.

Sallie Joy White.

LA PELEGRINA.

(Stories about Famous Precious Stones.)

FROM time immemorial pearls have competed with diamonds for the first place as objects of beauty. In some countries indeed, notably in Persia, the post of honor has been awarded to them in spite of the brilliant flashes of their more showy rivals.

Pearls differ in one essential respect from other precious gems in that they require no aid to enhance their beauty. They need only to be found, and the less they are handled the more perfect do they appear.

Unlike diamonds, pearls were known to Greeks and Romans, while the area over which they are found comprises a large portion of the globe, extending from China to Mexico and from Scotland to Egypt. A certain pearl of astonishing magnitude formed the chief treasure of ancient Persia, while every one is familiar with the persistent myth of Cleopatra's ear-ring and the cup of vinegar. People for centuries have wondered over the insane extravagance of the draught; but they might have spared their wonder, for no acid which the human stomach can bear is powerful enough to dissolve a pearl.

The various notions relative to the origin of pearls have done credit to the fertility of man's imagination. Some writers have affirmed that they were the product of "ocean dew," whatever that may be, and were accordingly affected by atmospheric conditions. Thus they were large and muddy during the season of the monsoon, becoming clear and lustrous again in hot dry weather, while thunder and lightning had a fatal effect upon them. These ideas were prevalent in the Ceylon fisheries, which at one time were most prolific in their precious crop. Another idea was even still more quaint. According to it, the oyster was looked upon as affecting the habits of the feathered tribe. The pearl was an egg which the oyster laid after the manner of hens.

Modern science, more exact if less imaginative, has decided that the pearl is due to an accident, and an inconvenient accident which

frequently befalls the parent oyster. A grain of sand, or some such minute foreign substance, gets within the jealous valves of the mollusk and causes great irritation to the soft body of the pulpy inhabitant. Accordingly it endeavors to render the presence of the intruder less irksome by coating it with exudations from its own body. In other words the grain of sand is "scratchy," so the oyster smooths it over. Why, then, after once coating the objectionable grain of sand and thus making it a comfortable lodger, the oyster should go on for years adding layer after layer of pearl-substance remains is truly a mystery. But such is its habitual practice, and to this apparently aimless perseverance we owe the existence of pearls.

Long before America was discovered by Columbus, pearl-fishing had been largely carried on by the inhabitants of the islands in the Gulf. When the Spaniards arrived in the South Sea they were charmed to find the dark-red natives decorated with strings of pearls. Montezuma was at all times bedecked with these glimmering little globules, and in Florida De Soto was shown the tombs of the chiefs profusely ornamented with the same gems. The mortuary shields were in some instances closely studded with thousands upon thousands of pearls; and many stories have come down to us of weary soldiers flinging away bags of these gems which they had in vain tried to exchange for food or water.

Pearls vary very much in size, ranging from the seed-pearl no bigger than a mustard grain to the Pelegrina as large as a pigeon's egg; and they vary also in shape. The most prized are the round pearls which besides their extreme rarity are supposed to have an especially delicate lustre; the pear-shaped pearl generally attains the greatest size.

The Pelegrina is a pear-shaped pearl weighing one hundred and thirty-four grains, and at the date of its arrival in Europe and for a century afterwards was the largest known pearl. It

came across the water in 1559, for the Pelegrina is an American prodigy. In that year, Philip II., King of Spain, was in a very festive mood. He had the year before lost his uncongenial although royal wife, Mary of England, and he was looking out for another bride. His choice fell upon Elizabeth of France, a pretty girl of sixteen who had been betrothed to his son Don Carlos. She arrived in Spain early in the following year, and Philip expressed his delight at her beauty. He lavished all sorts of presents upon her and amongst others a "jewel salad." In this quaint conceit the rôle of lettuce was played by an enormous emerald, which was ably seconded by topazes for oil, and rubies for vinegar, while the minor but essential part of salt was assigned to pearls.

Philip, whose one redeeming characteristic was a love for the fine arts, spent a considerable sum upon the purchase of jewels. He acquired a very large diamond just about this time, but the Pelegrina pearl was given to him.

Garcilaso de la Vega, that gossiping historian who incorporated every possible subject and all sorts of anecdotes into his history of the Incas, saw the Pelegrina. Of course so interesting a fact was immediately set forth at length in the *Royal Commentaries of Peru*, where it belongs at least with as much reason as the account of the writer's drunken fellow-lodger in Madrid.

He says:

"In order more particularly to know the riches of the King of Spain one has but to read the works of Padre Acosta, but I will content myself with relating that which I did myself see in Seville in 1579. It was a pearl which Don Pedro de Temez brought from Panama, and which he did himself present to Philip II. This pearl, by nature pear-shaped, had a long neck and was moreover as large as the largest pigeon's egg. It was valued at fourteen thousand four hundred ducats (\$28,800) but Jacoba da Trezzo, a native of Milan, and a most excellent workman and jeweller to his Catholic Majesty, being present when thus it was valued said aloud that it was worth thirty—fifty—a hundred thousand ducats in order to show thereby that it was without parallel in the world. It was consequently called in Spanish *La Peregrina* which may be translated, I think, into "incomparable." * People used to go to Seville to see it as a curiosity.

"At that time there chanced to be in that city an Italian

* The pearl was doubtless "incomparable" as de la Vega says, but at the same time it must not be supposed that such is the correct rendering of the word *Peregrina* or *Pelegrina* which means, originally *stranger*, hence our word "pilgrim."

who was buying the finest pearls for a great nobleman in Italy, but the largest gems he had were to it as a grain of sand to a large pebble. In a word, lapidaries and all those who understand the subject of Pearls said in order to express its value that it outweighed by twenty-four carats every other pearl in the world. It was found by a little negro boy, so said his master. The shell was very small and to all appearance there was nothing good inside, not even a hundred reals worth, so that he was on the point of throwing it back into the sea."

Fortunately he thought better of it and kept the insignificant shell. The lucky slave was rewarded with his liberty, while his master was given the post of *alcalde* of Panama, and the king kept the pearl.

The Pelegrina was found off the small island of Santa Margareta, about one hundred miles distant from San Domingo. Pearl-fishing, as then carried on by the natives, was a simple affair, although at the same time rather dangerous. The method was as follows:

The negroes having proceeded in their fragile canoes to the rocky beds inhabited by the oysters, the divers then attached heavy stones to their feet to expedite their sinking. Carrying a basket, a knife, and a sponge dipped in oil, they plunged into the sea holding fast to the rope which was to bring them to the surface again. Their noses and ears were stuffed with wool, but the pressure of the water frequently caused apoplexy, while sharks abounded in the vicinity. However, if the diver escaped both these perils, he proceeded as fast as possible to scrape off the shells with his knife and to put them into his basket. Occasionally he put the sponge to his mouth and sucked a little air from it, while the oil prevented him from swallowing any water. When he could bear it no longer he kicked the stones from off his feet, rattled at the rope, and was hauled up as rapidly as possible. Sometimes the divers remain "a quarter of an hour, yea, even a half" under water, placidly observes the padre in conclusion. Considering that he purports to have been an eye-witness, he should have been more careful of his written statements. From three to five minutes is the limit assigned by more cautious writers, and probably even this is an over estimate, as two minutes is now considered a long time for a good diver to remain under water without a diving bell.

Philip II. appears to have retained the Pelegrina for his own personal adornment and to have worn it as a hat-buckle. It looped up the side of his broad hat or cap according to the Spanish fashion. The black velvet and other sombre hues which he affected could hardly have given to the delicate gem the soft background which its beauty demanded. But if it is true, as has been asserted by poets, that pearls are emblematical of tears, then this great pearl was the most fitting ornament for a king who put his son to death, poisoned his nephew, burnt his subjects and devastated the Netherlands during quarter of a century.

Philip's son and successor, likewise Philip of name, made little use of the Pelegrina; but his wife Margareta wore it on the occasion of a grand ball which was given in Madrid in 1605 to celebrate the conclusion of peace between England and Spain.

James I. was very eager for the alliance of his son with the royal house of Spain. To effect this purpose he sent the Prince of Wales and his favorite Buckingham on a romantic mission to Madrid to make love to the Infanta. This was considered a very remarkable proceeding, and great was the astonishment of all the crowned heads throughout Europe who were in the habit of doing their courting by means of ambassadors, envoys, and other plenipotentiaries.

The Prince of Wales was received with great pomp. Balls, jousts and bull-fights in profusion were ordered for his benefit, and the King, Queen and Infanta loaded their visitor with kind attention. At the same time it must have been rather an irksome visit to all concerned. Charles spoke to the Queen once in French, she being a French princess, whereupon she advised him to do it no more as it was customary to kill any man who spoke to queens of Spain in a foreign tongue!

On the departure of the English prince gifts to a fabulous amount were exchanged amongst the royalties. One pearl in particular was declared by the court chronicler to be so fine that it might "supply the absence of the Pelegrina." The splendid pearl, thus highly rated by the Spanish courtier, was given by Charles to the Cardinal-Infante along with a pectoral of topazes and diamonds.

The Pelegrina appeared at most of the court pageants of Madrid, serving to deck either the kings or the queens during several generations. When, for example, in the summer of 1660, Philip IV. of Spain brought his daughter Maria Theresa to the frontier to be married to the young King of France, Louis XIV., the beautiful pearl appeared on the scene to lend its splendor to the occasion. Mademoiselle de Montpensier, the fantastic lady who was known in her day as *la grande Mademoiselle*, speaks thus of the Pelegrina and its wearer:

"The King (Philip IV.) had on a gray coat with silver embroidery: a great table diamond fastened up his hat from which hung a pearl. They are two crown jewels of extreme beauty—they call the diamond the Mirror of Portugal, and the pearl the Pelegrina."

On this occasion the two courts of Versailles and Madrid vied with each other in splendor, and their doings have rendered famous the little boundary river of the Bidassoa with its Isle of the Pheasant. A modern traveller whisking past in the train sees but little to recall the once famous spot; a half dried-up river and a marshy reed-covered swamp are all that now remain. The island is gone, so also are the royal houses whose meeting there was so great an event.

There is one occasion upon which the Pelegrina served to deck a bride so young and fair that it deserves more than a passing notice. The bride was Marie Louise d'Orléans, the first wife of Charles II. This poor sickly King, the last descendant of the mighty Charles V., was a very shy boy and extremely averse to the society of women. When he was about seventeen his mother and the royal council decided that he must be married, and they cast their eyes upon the neighboring house of France, into which Spanish monarchs were in the habit of marrying when not engaged with it in war. The only suitable lady was "Mademoiselle"—for such was in ancient France the distinctive title of the eldest niece of the King. Mademoiselle, besides being niece to Louis XIV., was furthermore pretty, vivacious, and only sixteen. Her portrait was sent to Spain, and what was the amazement of the court to see the shy young king, who could scarcely look a woman in the face, fall violently in love with this portrait. He kept it always

beside him and was observed frequently to address the tenderest expressions to it.

Such being the satisfactory state of the King's feelings the match was rapidly concluded, and Marie Louise set out from Versailles to go to her unknown husband. On his side Charles II. went forward to meet her as far as Burgos, and there they first saw each other in 1679. When the King was unexpectedly announced, Mademoiselle was observed to blush and look agitated which made her all the prettier. As Charles entered her apartment she advanced in order to kneel at his feet, but the Boy-King caught her by both arms and gazing at her with delight cried, "My Queen, my Queen!"

Although she arrived in Madrid in the autumn of 1679, the young Queen did not make her state-entry into her capital until the following January. In the meantime she was kept in the closest seclusion. Not all the power of the King of Spain joined to the love which Charles bore to his wife was sufficient to break down the adamant wall of etiquette which long usage had built around the queens of Spain. Like a Moorish slave in a harem, the gay young French girl was shut up alone with her Lady of the Bed-chamber and was permitted to see no one except the King. She was not allowed to write to her own family nor receive their letters. She was even refused permission to read a letter from Paris which a compassionate friend sent her in order that she might hear a little news. She was a prisoner indeed, although the prison was gilded. It needed something to atone for two months of such a life, and if a grand display could sweep away the recollection of it that consolation was not withheld.

On January 13, 1680, the Bride-Queen at last entered Madrid. Madame la Mothe, whose keen French eyes saw everything and whose sharp French pen chronicled it, has left a minute account of the ceremony. She says:

"The Queen rode upon a curious Andalusian horse which the Marquis de Villa Magna, her first gentleman-usher, led by the rein. Her clothes were so richly embroidered that one could see no stuff; she wore a hat trimmed with a plume of feathers and the pearl called the Pelegrina which is as big as a small pear and of inestimable value, her hair hung loose upon her shoulders, and upon her forehead. Her neck was a little bare and she

wore a small farthingale; she had upon her finger the large diamond of the king's, which is pretended to be the finest in Europe. But the Queen's pretty looks showed brighter than all her sparkling jewels."

There is a picture still extant of this queen, which proves her to have been pretty in spite of the disfigurement effected by some of her sparkling jewels. Madame la Mothe does not mention what the picture shows, namely, that the Queen's ears were weighted down by a pair of ornaments as large as saucers which the Queen-mother had presented to her. Above the earrings moreover were a pair of huge jewelled rosettes fastened to the hair in such a way as to make one almost fancy that the ears were being dragged out by their enormous pendants and had to be nailed up by the rosettes.

Marie Louise lived but a few years to enjoy the love of her husband and the splendor of her rank. It was said that she died of a broken heart caused by the torments of court jealousies and intrigues against which the King, her husband, in vain tried to shield her.

Charles II. died in 1705, and being childless he bequeathed his crown to Philip of Anjou, grandson of Louis XIV. and cousin to the wife of his youth whose memory was still dear to him. Of course other claimants arose to grasp so splendid an inheritance, so that the funeral torches of Charles may be said to have set fire to Europe. At all events, a vast conflagration soon burst forth known as the War of the Spanish Succession, which included ere long within its fiery embrace Spain, France, England, Austria, Italy, Germany and Holland. After all their fighting however Philip still remained King of Spain, and the house which he founded is now, in the person of the Baby-King of Spain, the last reigning example of that mighty tribe of Bourbons which at one time ruled over so large a portion of Europe.

During the first years of his reign Philip V. had to fight for his throne, nor was he invariably successful. At one time he was so hard-pressed by his rival, the Archduke Charles, that he had almost to seek refuge in France. By the urgent entreaty of his ministers the King and Queen did not actually quit the soil of Spain, but the Pelegrina did do so. The invaluable pearl, along with the rest of the crown jewels, was en-

trusted to a French valet named Susa, who crossed over the frontier into France, kept his treasures safe until the danger was passed, and then when the tide of success began to flow for Philip brought them back again to Madrid.

This is the last authentic appearance of the Pelegrina in Spanish history. After this date, 1707, its story becomes confused and oftentimes contradictory. It is alleged to have been given first to one favorite and then to another, while finally as a climax of confusion another pearl in Spain, one in Sardinia, and one in Moscow, impudently assume its name and masquerade as the true and veritable Pelegrina.

Our own inquiries both in Madrid and St. Petersburg have failed to supply the links that are missing in its history. We cannot say when it finally passed away from the crown of Spain, for there have been many clearances of the royal jewels to meet the exigencies of various kings. At all events, for the last thirty years

it has been in the hands of a Russian family. The Oussoupoffs belong to the ancient nobility and they are extremely wealthy; but how and when the Princess Oussoupoff became possessed of the Pelegrina we do not pretend to say. The friend who made the inquiries for us said significantly that it was impossible to ask many questions in Russia. Questions, however innocent, are looked upon with great suspicion and any questioner is liable to repent of his inquisitiveness. It is a pity that so historic a gem as the Pelegrina should be practically lost to us in a Russian lady's jewel casket. Any other large pearl would have served her purpose equally well for mere ornament, and had the Pelegrina remained in Western Europe we should probably know something more about it or at all events we should be able to ask what questions we like without incurring the suspicion of treason and of being desirous of hurling the Romanoffs from their throne.

Mrs. Goddard Orpen.

THE TOOTH OF TIME.

(Geological Talks.)

I SHALL never forget a trip I took one time while yet a small boy. It was a beautiful autumn day and my mother and I visited the Lower Fall of the Genesee at Rochester, N. Y. In those days it was a wild spot. There was no elevator, nor "Falls House," nor great "works" for compressing air there then. The only evidences of human labor were the road gently sloping downward along the cliff-side and a flight of rickety wooden steps that seemed very many and steep and dangerous to me.

But the scene was more beautiful than it is now. Standing amid a mass of purple asters and golden-rod in bloom we looked down the river between those great rock-banks, perpendicular and bare, gorgeous with nature's red and green and gray. The river, dark and muddy, flowed quietly away toward the Lake. In front of us and just under our feet it plunged, in a

mass of foam-covered waters, over the shelf of red sandstone, ninety feet into the gulf below where the water, now foam indeed, whirled itself madly against the rock-banks, swept under a table-rock and beat itself hither and thither in its efforts to find its way out. A cloud of spray constantly rising from the water added beauty to the scene. It was a lovely spot. I have seen many scenes more famous since then, but few that better deserve renown.

Let us look more closely at these banks. They repay a close inspection. Look at the cliff opposite us. Beginning at the water's edge rises a great belt of dark red sandstone, massive and solid, quite ninety feet thick. Then come perhaps fifty feet or more of thin beds of limestone and of shale of different colors, mainly grays and greenish blues. In the midst of these there are three layers that catch the eye. One

is a limestone layer not more than six inches thick; it is made entirely of fossil shells, pearly and pretty. One, thinner yet, is a black shale — a sharp eye is needed to detect it; it is covered with "graptolites," queer black lines edged with minute saw-tooth projections. The third is thicker, perhaps a foot thick, striking on account of its brilliant red color — no particular keenness of sight is needed to see this; it is an iron ore. Above this fifty feet of shales of varied colors, comes a mass of darker shales which makes up the balance of the cliff.

Look up stream and we see where the water gets its foam before it reaches our Fall. There is the Middle Fall, not so high, not so beautiful, long ago made of use by man to drive his mills. It is about twenty feet high and falls over a ledge formed by a layer of limestone a foot thick and crowded with shells turned into stone. We can trace this layer of limestone in the opposite bank, and at the Lower Fall find it to be twenty feet and more above the brink. Follow up the river a mile and a half and we reach the Upper Fall — about the same height as the Lower but in totally different rock. It falls over limestone, lying upon soft black shale, the lower layers of which perhaps are the upper layers in the bank at the Lower Fall. We can trace these layers easily on account of the well-marked color in some layers. All of them dip down as we go up stream.

In diagram *No. 1* I have tried to show the arrangement of the rocks with regard to the Falls; *a* is a hard sandstone over which the Lower Fall plunges; *b* is the belt of variously-colored shales; *c* is the limestone over which the Middle Fall is made; *d* is the upper layers of colored shale; the dark shale *e* above which is the limestone which supports the Upper Fall. The bank of the river is shown beyond and above with dotted lines to define the positions of the beds. At the Lower Fall the bank of rock consists of *a*, *b*, *c* and *d*, or red sandstone, colored shales, limestone and darker shales as already described. At the Middle Fall the bank consists of a foot of limestone and then of some colored shales, then of black shales. At the Upper Fall the banks consist of limestone. 1, 2, 3, are the Falls — Lower, Middle and Upper; *hh* is the top of the opposite bank.

Once there were no Falls here at all. The river must have flowed along on the surface from *h* to *h*. If there were a Fall at all it was near where the river emptied into Lake Ontario. There may have been a rapids here. If these rocks were all equally hard there would still be a rapids from Rochester to the Lake. But they vary in hardness; the shales are very soft, the limestone and sandstone are hard. The water of the river cut into the rock. It cut shale fast, limestone and sandstone slowly. As a result of this and of the slope of the rocks we have our three Falls.

The river cuts its channel in two ways; downward deeper, and backward up-stream. Wherever there are hard layers with softer ones below, we shall find falls — with rapid or still water below. If we imagine a fall at Lake Ontario and a flow of water along the surface,

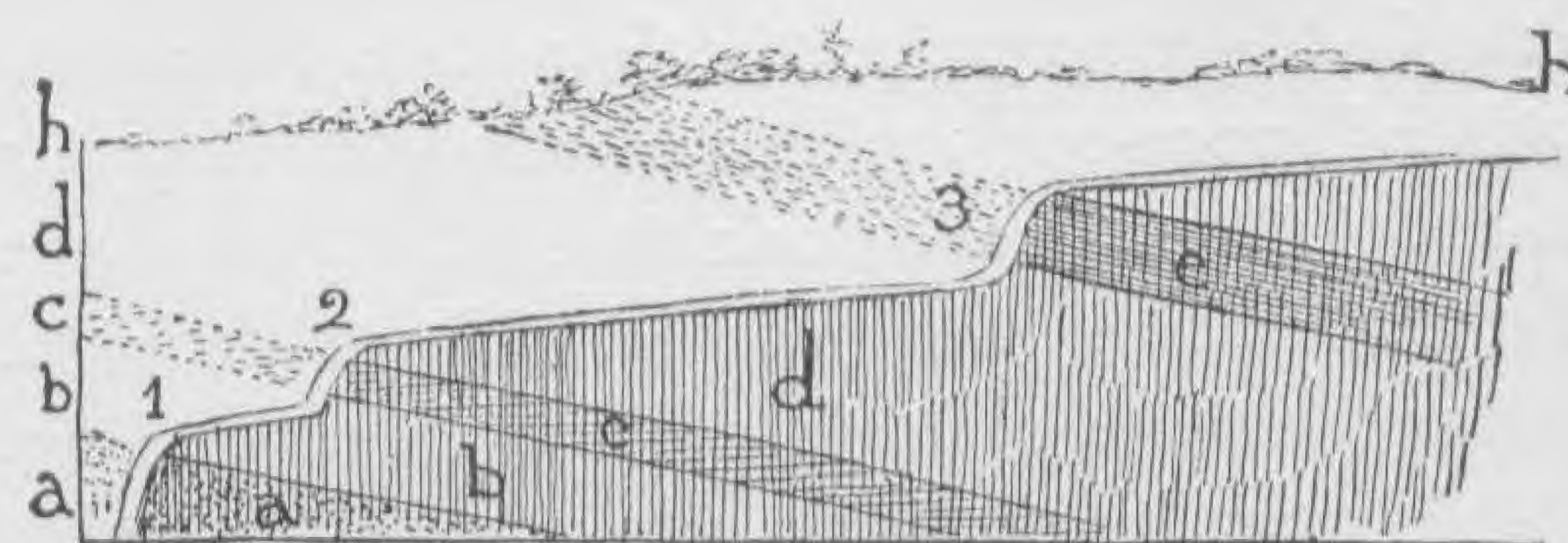


DIAGRAM NO 1.

the necessary result of river-action will be a gorge with falls at the points where hard layers come to the surface.

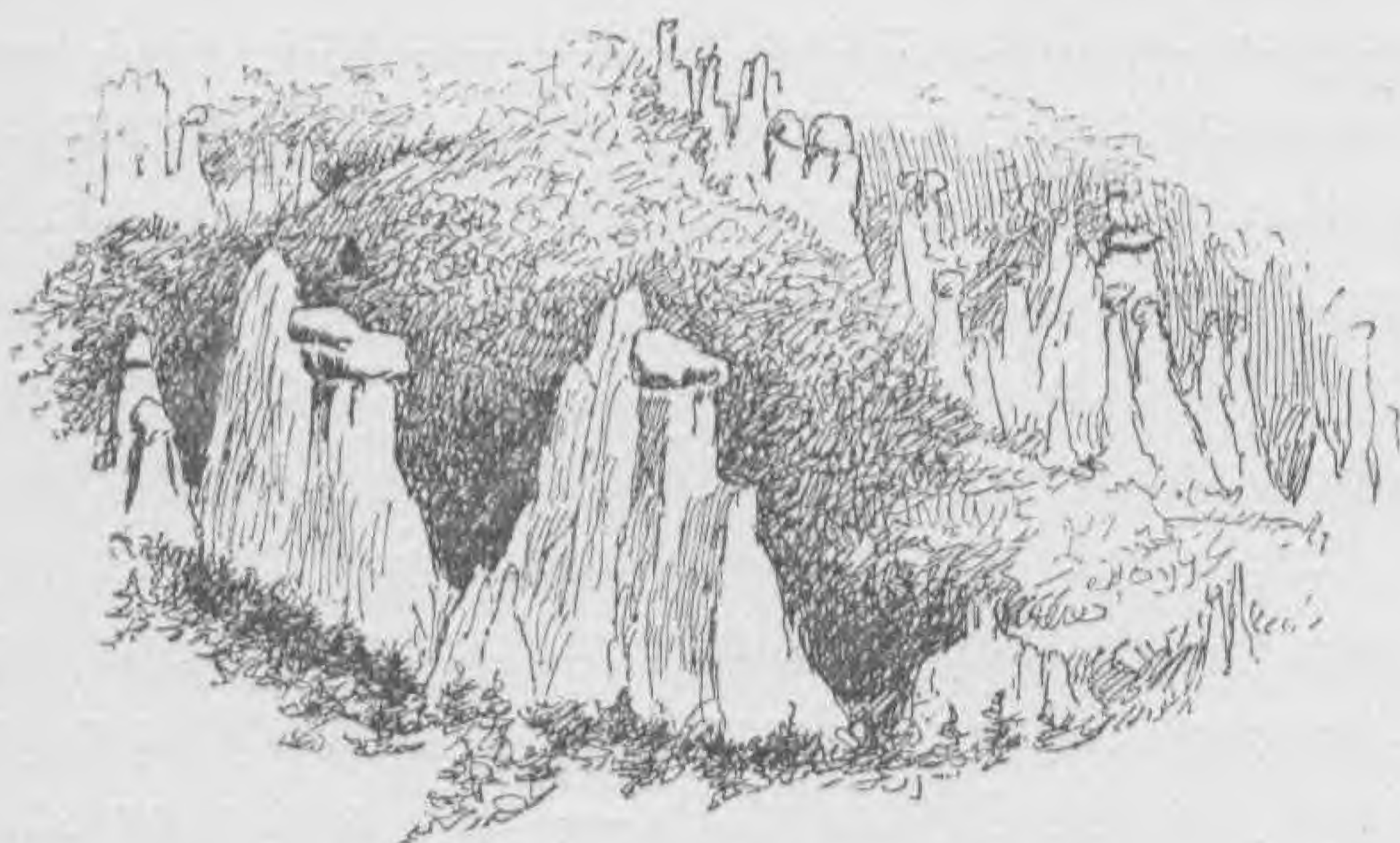
Let us now take the Falls as they are. If the sandstone *a* is harder than the limestone *c*, the Lower and Upper Falls will become further and further apart. If the layer *e* is harder to wear than *a* and *c*, in time all three Falls may come together and make one Fall.

The point illustrated by the Falls is this: solid rock is all the time being worn out, ground up, wasted away, by rivers.

All the falls in the world are like this. They are produced at points where harder and softer layers of rock occur together and the harder resist the cutting of the stream more than the soft, so as to form shelves over which the fall takes place. All are moving backward. Niagara has cut its way back through seven miles of rock and is still retreating toward Lake Erie. Au Sable Chasm is a stream-worn gorge. Watkins Glen and the hundreds of other glens in

the Lake district of New York are crevices cut by streams.

Saw, saw, saw, all the world's rivers are cutting and the rock saw-dust they make is carried down by their waters to the sea. Every little stream entering the Mississippi carries its load of rock-



EARTH PILLARS NEAR BÖTZEN.

dust to the "Father of Waters" to be carried on to the Gulf. Every year the Ganges carries ship-loads of worn-out rock and dumps it near its mouth. All the solid rock that filled the gorge of the Genesee has gone into Lake Ontario. So has the seven-mile plug of the Niagara cañon.

This wear by rivers is only one way in which the old earth is cut and gashed and worn by the tooth of time. There are many others.

In limestone regions are many "sink-holes." Once one was formed near my old home in New York. In a level field one day there was a disturbance—a noise and a jar and the field was no longer level! A round or oval area some yards in diameter had sunk in, or "caved." A very simple matter; water had soaked into the crevices of the limestone rock. It had probably some carbonic acid in it—most rain-water has. It dissolved away the rock and little by little a subterranean stream was made. More and more it wore away the rock, all unknown to man, until it at last gave way. In some districts such sink-holes are almost too common to attract attention. In Kentucky, where there are over one hundred thousand miles of caves or subterranean water-courses, they are especially common. All this worn-away and dissolved stone must go somewhere. Probably it, too, is poured into the sea.

A mighty agent of wear and tear is the sea. Its waves are powerful; they eat into a rock-bound coast and make it broken and jagged.

Here they cut sea cliffs, there they carve out caves and caverns or gnaw away rocky islands from the mainland. Of course the waves of lakes act in the same way.

Again, go to Cape Cod and, on a bleak and windy day, how the fine gritty sand fills the air! It cuts and stings as it blows against your face. It even wears its way through window glass. In some places such wind-blown sands wear rock-surfaces smooth. But polishing means wasting away, and these parts rubbed off are ready to travel by wind and water to the sea.

Even raindrops themselves wear away world-rocks. Sir Charles Lyell figures and describes a place in Europe, Bötzen, where an old terminal moraine, made of stiff clay crowded with boulders, has filled a valley. The rain constantly wears it away. Of course as soon as a stone is encountered it protects the clay below it, and as a result a pillar is produced capped by a boulder. Hundreds of these "earth-pillars" are there, each with its cap. But all that was between has gone—carried away by the rills resulting from the rains. In Colorado is the wonderful "Garden of the Gods," full of quaint monuments of stone, slender columns, all the work of rain. There are thousands of them at the Garden and Monument Park and other less famous places—but think of the mass that is gone! these are all that is left of solid rock-beds! There is no need of citing more such cases; they occur on every continent. The old earth's face is worn into deep furrows and sad wrinkles and there are many scars on it.

The very atmosphere itself, without rain and without wind, incessantly gnaws at the earth's crust. Oxygen and carbonic acid and the gases of decaying matter all destroy. Growing plants insert their minute roots into cracks, and these by growth tear rocks asunder. Water sinks into fissures, and by freezing tears off huge masses from the cliff. There is no rest. Night and day, winter and summer, in heat and cold, the old earth is being hacked and gashed and bitten into. We admire the picturesque and wild in scenery, but it is only ruin—the result of wear and tear.

So much for the modes of action. Now let us look at some results. Watkins Glen is a deep narrow cleft in sandy shale-rock. Different

kinds of rocks wear into different shapes. The small stream here has cut out a lovely gorge three miles long. You mount to the summit of one Fall only to see another. There is no great amount of water in the stream, but it has acted for a long time. The sides of the gorge are worn into smooth round outlines. There are no angles here. At the bases of the falls are wonderfully beautiful basins or "pot-holes," as they are called, as perfectly rounded as if made by man. They have been worn by the falling water and by the whirling pebbles at their bottom. The water is perfectly clear and you see the pebbles as plainly as if there were no water over them. You bare your arm to the elbow and reach for a pebble. Your hand does not touch bottom so readily as you thought. You may wet the sleeve to your shoulder and still not reach the pebble. You grow desperate and with a stick reach down and find the water, apparently so shallow, really five, eight or ten feet deep. In fact it is frequently as deep as the pot-hole is wide. I cannot understand the clearness of the water in these "fairy pools." One pot-hole into which a fall hurls itself, has water that looks black as ink. It must be very deep. I tried to measure it with a stick one day, but could not. I am told it is sixty feet deep. I do not know. But the point to observe is that at Watkins Glen we have the rock, a sandy shale, worn into smooth curves and beautiful round pot-holes.

Now go up to Havana Glen, only three miles distant. Here the rock is a black shale, dividing by joints into great rectangular or square blocks. We find no sweeping curves in the banks and few or no true pot-holes. The great blocks fall out in squares and leave straight walls and right angles. We have "council chambers," not "fairy pools."

Look at the wonderful "Pictured Rocks" of Lake Superior, produced by the incessant beating of the waves against sandstone. Great caverns have been hewn back into the cliff and these unite within with one another and grand arches and pillars sustaining roofs are the result.

Again take a stream trying to cut its way through a set of layers. Suppose the uppermost layer to be firmer than the rest, resisting water more successfully, not only in the matter of wear but also in that of percolation or soaking. The

lower layers might become filled with water until, at last, the stream might soak down into this lower layer and through it rather than try longer against the harder upper stratum. The result might be a channel formed below a natural bridge somewhat like the one in Virginia.

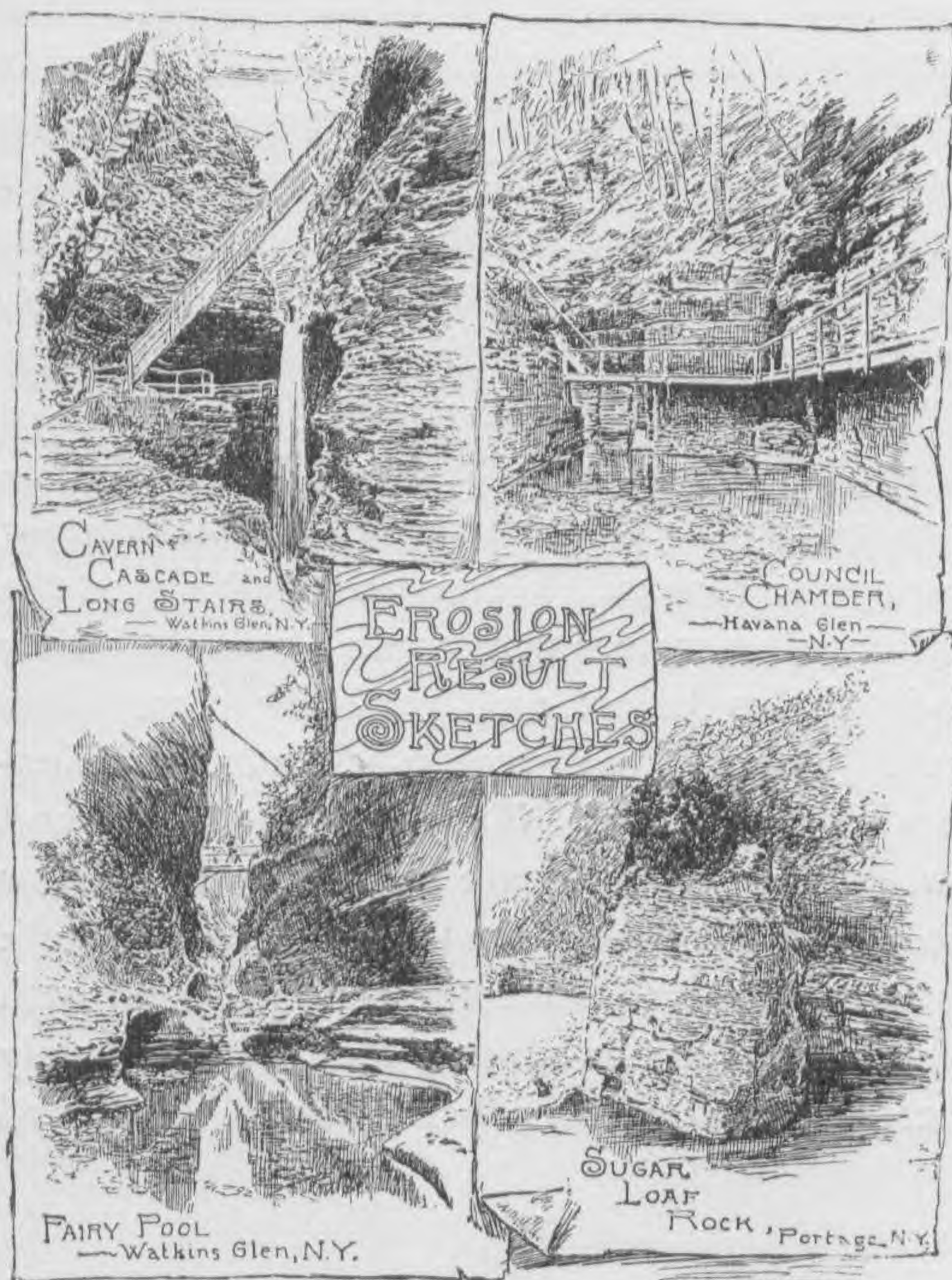
Another interesting result of the incessant gnawing of the tooth of time, somewhat similar in method to the last though very different in result, is a "Rock City." A very good example is "Panama Rocks," eight miles south of Chautauqua. Originally there was a great ledge, seventy feet thick, of hard quartz conglomerate or "pudding-stone," below which were beds of softer shaly and sandy layers. The conglomerate was jointed by narrow cracks into great rectangular blocks. Water works slowly on the hard conglomerate, but it soaked into the softer sandy shales below and gradually wore them away. This left the great blocks of conglomerate with no support. They separated, slid and now remain great square masses, with narrow streets and alleys between them. One may walk through these and have the rock walls on both sides, rising sixty or seventy feet. It is a lovely place, the rock masses being moss grown and



tufted here and there with ferns and flowering plants; great trees grow on the separate blocks and to hold their places send out immense gnarled roots over every side; in some of the deeper clefts, where the sun seldom shines, snow and ice linger long and one may make

snowballs in August. All this beauty and romantic scenery is due to the wearing away of the underlying rocks.

Another interesting point connected with erosion or rock-wear, may here be mentioned.



By a study of its results and action, we may make some calculations of time that are valuable. To illustrate my meaning: years ago I visited the Falls of the Genesee at Portage, N. Y. As at Rochester the river here makes three leaps and passes through a lovely gorge. The Lower Fall is most interesting. At this point the river is greatly contracted in width. From being many yards across, it suddenly narrows to eight or ten feet. All the water pours through this narrow gorge in a deep sheet. It is as if we turned the river on edge and poured it through the channel in that position.

Let us locate some points of reference. We are on Table Rock, a cliff on a level with the river at the top of the Fall. This cliff ends in a sudden angle around which the river bends sharply just after taking the Fall. In diagram No. 2 *b* is the narrow channel through which the river falls. In front of the Fall rises "Sugar

Loaf Rock," *c*, named from its shape. The river takes its fall, strikes up against the base of Sugar Loaf, turns sharply, sweeps up against Table Rock and then, bending, pursues its course in its original direction and between grand cliffs three hundred feet high. Fifteen years ago when I saw it this was the condition of things.

Five years ago I was there again. Table Rock and Sugar Loaf were but little changed — but the Fall, where was it? My memory is fairly good — I do not pretend however to exactness here — but the Fall had worked back about four hundred feet, forty feet a year. This very rapid retreat is due to the softness of the rock and the peculiarly contracted channel whereby the water is given a tremendous power.

Well, if we know the rate at which a fall is now retreating, and there is reason to believe the rate is steady, we may calculate the length of time it has taken to wear out its gorge. The Falls of St. Anthony have cut their gorge since the Great Ice Age. The date of that age is a matter of some importance. If we can calculate the length of time represented by the channel, we have approximately the date wanted. Such a calculation has been made and it suggests a period of about eight thousand years.

In course of time this wear and tear amounts to much. The old continents are wearing down. Every month America loses enough to make many a good farm. The Mississippi Valley loses one foot in five thousand years. That seems like a small amount, but it is really very great. The Ganges Valley loses one foot in one thousand eight hundred years. Such wear is gradually reducing the continents.

Of course elevated lands wear away faster than lowlands. This, because the surface water and rivers have a greater pitch, and hence greater erosive and carrying power. With continued erosion, would come slower streams and less active operation. Finally, all the mountains being levelled, the streams would have no pitch, erosion by streams and rains would cease, and a vast plain with slug-



DIAGRAM NO. 2.

gish, canal-like streams and standing, stagnant pools would be our continents. As a matter of fact this is never likely to happen. Why, I shall tell you again. I have said enough for this time about the "Tooth of Time."

I will only add that this transported matter or sediment from rock-wear all goes somewhere. Some dropped at a river's mouth in quiet water forms a "delta." This may come to be dry land and add to the continent's area, while the river cuts a channel through it to the sea. Some may be caught up by currents in the ocean and

carried out to sea to be dropped, forming beds which may add to the continent, though below water. Again, some may be dropped where the river meets a current, forming a "bar" off the coast, which may in time be worked by sea waves into a coast island like those off North Carolina. Or two sea currents, each carrying a load of sediment, may meet and drop their loads forming a "bank" far out at sea. In one way or another the material carried from the continents is re-deposited. It is never lost—it is only put into a new place.

Frederick Starr.

LOGOMACHY CARDS AND A PARCHESI BOARD.

(Ways To Do Things.)

MY children wanted me to buy them the games of Logomachy and Parchesi, but I told them if they would make the games themselves—as they were perfectly able to—in good shape, they might have the money thus saved, and as much more, to buy books with, to which they gladly assented.

The Logomachy was easy enough. They hunted up odd pieces of photographer's board, and card board, and carefully cut the requisite number of cards; then they got a neighbor's boy to print the letters—if there had been no one to do this without expense they would have cut letters from newspaper-headings and pasted them on, which would have answered very well. There they had the pack of cards (three and a fourth inches by two and a fourth) with a little painstaking, as pretty as a "boughten one."

Lest you should not be sure about the number, I will add that there were fifty-six; four each of A, E, I and O; two each of B, C, D, F, G, H, Q, M, N, P, R, S, T and W; three each of U and Y. Then J, K, V and X were each marked "Prize"; and Q and Z "Double prize."

The Parchesi board they made is good enough for anybody, and it did not cost a cent; and the beauty of it is that when it gets soiled or shabby it can be made right over new. They took a piece of thin board, twenty inches by sixteen,

and on both sides and over the edges they carefully pasted tinted paper—choosing tinted because it would keep clean longer than white; it was nothing but manila of a fine quality, some that we had in the house. Next they decorated what was to be the back side with some pretty chromos, a centre piece, corner pieces and a border. There was plenty of material for such purpose that had been saved up for possible use, such as decalcomania pictures, flower groups, scrolls, and all manner of gay, ornamental things cut from advertisements, almanac covers, circulars and anything that came to hand.

Then for the outside—the game side—they pasted on this tea-colored ground of manila, a sheet of drawing paper fifteen inches square, leaving a neat-colored border all round. Then for the plan, the sort of Maltese cross, they first got the measure of a game they had to look at, and then carefully drew the lines, making the divisions about five inches by five (of course you need to have a Parchesi board for a guide), and then painted the lines in the most vivid red, broad and striking, and the "stations" in the same color. In the middle the word H O M E was also in red. The four circular starting places in the corners were outlined in black, and their divisions were also lined in black; the centre was blue, two opposite segments were

yellow, two green, two pink—all the colors very bright.

When you look at a board, you will see how beautiful you can make the arrangement of colors, and will understand at once how to go to work with pencil, paint and brushes. It is merely a matter of taste, care and neatness of handicraft, a good eye, a little patience, a dainty way of doing things—given these, and any boy or girl can make a very handsome Parchesi board that they will enjoy more than if they had paid out a dollar for it.

I must not forget to add that we had seven

sets of counters, in black, blue, pale green, scarlet, yellow, dark green, and pink (the variety was pleasant and made a change in playing), and all were cut with a punch from the covers of pasteboard boxes. So our game was cheap, though ever so gay and attractive; and the young people find it a never-failing source of amusement on rainy days and in the evenings after their lessons are over. The same may be said of the Logomachy, which has been an educator in the knowledge of words, not only to them but to the older members of the family, who like to have a part in it.

Jean S. Emmons.

THE FESTIVAL OF FINDING THE TRUE CROSS.

EARLY in the autumn, all over Syria and the East, is celebrated the finding of the True Cross by the Empress Helena.

You know the legend—how leaving her palace in Constantinople the Empress set sail for the Holy Land. All along the coast huge watchfires were built and relays of watchers appointed. As soon as her search was rewarded the light on the nearest hilltop blazed forth the glad tidings, and as if lighted by the magic touch of a swift-flying angel one hill after another caught up and carried forward the news from one end of Syria to the other, across Asia Minor, and the Bosphorus until the answering shout of joy rang within the palace walls at Constantinople: "*Joy, joy! The Cross is found!*"

Now, hundreds of years later, when the telegraph wires spread news of joy faster than the old system of watchfires, we here in the East yearly gather round a ruddy blaze to celebrate this search and hold a festival with songs.

Right below our Mt. Lebanon home in an open field was a long flat rock especially dedicated to use at this festival. All the children of the village for days beforehand would climb the high mountain slopes back of the village in every direction for *bellân* or the sun-dried crackling thorns. On our rock we would first build a

high tower of sticks, mostly abstracted by stealth from the woodpiles at home. Around this, and overtopping it, the bundles of thorns were piled—a cord at last being wound spirally around to keep all in place. Just as soon as it was dark—and how eagerly we watched for the time to come—we would all gather around, forming a circle, and dance until our leader—chosen as having contributed most toward the bonfire—would set fire to the pile. Fanned by the evening breeze it would almost immediately shoot up into a huge pyramid of flame scattering sparks in all directions and giving active employment to the older ones in preventing the venturesome little ones from making martyrs of themselves in their excitement. As the thorns burnt up we replenished them from neighboring reserve piles.

When all but the largest logs at the centre and base had been consumed we would again form a circle and the maddest, merriest time would then ensue. Breaking out into a wild song we would incite one another to brave the flames and jump through, or over, the wide bed of live coals. The older ones leading, one and another would break away from our circle, leap across, rejoining it at the other side. With our bare feet and simple blue dyed cotton garments

this meant severe burns and much danger, for the circle of fire was a wide one, and the hot brands and ashes were spread about in all directions; but he was indeed a coward who before the evening's close had not attempted and accomplished the feat — not one, but several times.

At the close of the evening we would end our feast by partaking of little cakes baked with oil and sweetened with honey. Then joining hands for the last time around the dying embers we would repeat an invocation to the clouds to send us rain once more, and to the earth to re-open her springs, to refresh the thirsty soil. From April to October we rarely have a drop of rain about Mt. Lebanon, and mothers always say their mothers told them that the early autumn rains waited for the Empress Helena to accomplish her errand lest they should endanger the success of her watchfire signals, and that year

by year since the rains wait for this festival, lest they should extinguish the memorial flames.

In later years we have often climbed to the very top of the high mountain near us to watch the neighboring villages. As many as thirty or forty bonfires could be seen from this point, all along the sea-coast, on neighboring slopes, and up a long valley which opens towards the east. Every little hamlet — even the sheepfolds sometimes sent forth a light into the surrounding darkness. The whole dark expanse below as well as the sky above would be ablaze with sparkling points of light and the effect was not one to be easily forgotten.

So little of pleasure comes into the life of a child in our downtrodden and unhappy land that anything that connects happiness and joy with the life and cross of Him who was once a child in Nazareth is a great blessing.

Fedduk Zahar.



MAHOMETAN CHRONOLOGY AND RELIGION.

(Search-Questions in Mahometan History.)

41. From what event do Mahometans reckon their chronology?

42. What is the length of the Mahometan year as compared with ours?

43. Name the Arabian months in their order.

44. How many times a day is the observance of prayer enjoined upon Mahometans?

45. Name a needful preliminary to prayer.

46. What day of the Moslem week corresponds in a measure to the Christian Sunday and the Jewish Sabbath?

47. In what direction do Mahometans face in prayer?

48. What is call to prayer named, and what is the usual formula?

49. What month is given to an annual fast?

50. How is the manner of fasting regulated?

51. With which of our months did the month of Ramadhân correspond when the fast was ordained and when does it now fall?

52. State very briefly of what the Korân or Mahometan Scripture consists.

53. How was it preserved in the lifetime of the prophet?

54. How was the present authoritative form of the Korân obtained?

55. What are the commands of the Korân regarding games of chance and the use of wine?

56. Give the substance of the first Sura or chapter of the Korân.

57. What is the central belief of the Mahometan faith?

58. Which had the greatest influence on the Mahometan religion, Judaism or Christianity?

59. What was the fundamental difference between the aims of Jesus and of Mahomet?

60. In what important respect was Mahometanism superior to the faith it overthrew?

3. Tribal. Each tribe was governed by its own unwritten laws.

4. The chiefs of Mecca.

5. Zemzem.

6. A. D. 570. Abraha, the Abyssinian viceroy at Yemen, invaded Mecca with an army in which was an elephant, an animal before unknown in Arabia.

7. The Hâshimites and the Omeiyads, or Ommyads, as the name is frequently spelled.

8. August 20, A. D. 570 "The Year of the Elephant." This is the date assigned by the noted scholar, Caussin de Perceval. E. A. Freeman considers 569 the correct date, and E. H. Palmer, the translator of the Koran, names April 20, 571. The weight of authority is in favor of the date first given.

9. The Praised.

10. In that of a shepherd upon the hills about Mecca.

11. Al Amîn, "the faithful."

12. Khadîja, a wealthy widow of Mecca.

13. He became exceedingly thoughtful and contemplative and often remained for days at a time in a cave at the foot of Mount Hîra, a few miles north of Mecca.

14. Forty-four.

15. About forty, including his wife Khadîja, his cousin Ali, and his bosom friend Abu Bakr.

16. In 615, by the advice of the prophet a number of his followers fled to Abyssinia to escape persecution at Mecca.

17. The death of his wife, Khadîja. Her tomb at Mecca is still an object of pilgrimage.

18. The planting of the faith at Medîna.

19. To Medîna.

20. June 20, 622. This is the date of the prophet's flight; that of his adherents had been in progress for two months previous. Authorities differ as to the day of Mahomet's flight, and July 15, July 16 and September 22 are given by other historians as the exact dates in their respective opinions.

ANSWERS TO DECEMBER SEARCH-QUESTIONS.

1. To Ishmael.

2. The temple or Káaba.

Oscar Fay Adams.



A LESSON IN BOILING.

(Cooking in the Public Schools.)

THE little girls were folding up their aprons and putting away their caps after one of the lessons, and making ready to go home. I asked a bright miss of about twelve what she had learned.

"Oh!" she replied, "I have learned to make a fire and take care of it, to put away my things neatly after I am through my work, to look after my utensils and my towels, to bake potatoes and apples, and to make buns."

She told off the list of accomplishments with a pardonable air of pride.

"But you have learned to do these things here," I persisted; "have you done any of them at home?"

What a sparkle there was in the bright blue eyes!

"Yes, indeed," she said; "why, only this morning I took my mother's receipt-book and made the gems for breakfast by her rule. I not only mixed them, but I attended to the baking. I arranged the dampers, and no one but myself even looked at the oven once. My father said the gems were the nicest he ever tasted, and my mother said that was real cooking; that it was easy enough merely to mix things together, but the test of a good cook was in the baking."

And "mother" was right. Now I dare say all the lessons we have gone over have seemed very simple, and it may be that some of you are inclined to look with a little feeling of contempt on the small number of rules that have been given. But you must remember that we are learning principles, and that when these are well understood you can take any one's receipt-book and do anything you please, just as the little girl I have told you about made successful gems when she had learned how to manage

her oven with such simple things as potatoes and apples.

I have a friend who is a very fine and very successful singing-teacher. He trains the voices of his pupils very carefully, with exercises that are best calculated to develop them. Now and again some pupil gets impatient over these exercises and begs to know when she can have a song to learn.

"When you know how to sing," is the invariable reply. "You must first know how to use your voice, then you may buy out the music store if you wish."

There it is again, you see; principles first, afterwards achievement. And so it is in everything, and so it must be. Theories are very fine, no doubt, but they do not always take the place of principles. Not very many days ago, I was reading one of the many theoretical articles that are written on the subject of housekeeping. The writer in advising housekeepers how to keep ahead of their work, said that every night before retiring, the fire in the kitchen stove should be laid for the morning, and the tea-kettle filled. Fancy using water for tea or coffee or cocoa that has stood in a kettle for twelve hours. Why, any housekeeper, no matter how inexperienced she was, would know better, and certainly every schoolgirl would, after she had taken the present lesson on boiling.

We have a fashion of speaking about boiling food, such as potatoes, and other vegetables, grains and some meats. Now the proper way would be to speak of them as cooked in boiling water; the articles themselves do not boil, only the water in which they are cooked. Baking is cooking by a dry heat; boiling is cooking in a boiling liquid. This is one of the most common

forms of cooking, and the liquid that is most usually employed is water. By trying experiments with the water, that is, by watching it as it boils and testing it to find the temperature — these facts are discovered :

That water boils at 212° , or when it bubbles all over the top. That when once it boils all over it will become no hotter, and that fuel and heat are wasted when it boils at a galloping rate.



COOKING IN BOILING WATER.

This is a very good thing to know, because many people imagine that the more furiously anything boils, the hotter it gets and the more rapidly it cooks. That is a false notion, as you can tell by testing the water during boiling by a thermometer that is made on purpose for testing the heat of liquids. So here is something that it is well, in the interests of economy, to remember.

The kettle should never be so full that the water will boil over as it expands in heating. There is danger of injuring the stove if this

is allowed, and, too, there is always danger of somebody getting scalded, which is, as you probably know, the most painful of all ways of burning the flesh.

You find too, what so many people who cook forget to remember — that there is a wide distinction between “boiled water” and “boiling water,” and that the freshness is lost by long boiling, so that the sooner water is used after once boiling the better it will be. Indeed if it stands its loses all its vitality, and cannot be used with good results. That is why tea and coffee are often so lifeless; not because the leaves and berries are not good, but because they are improperly made with “boiled water” instead of freshly “boiling water.” You see there is a wide distinction between the two.

The lesson in boiling takes up the boiling of vegetables, potatoes being taken as the demonstrating article. The principles for cooking all vegetables are the same, and if the pupil learns to cook one kind well, she can, by following the particular directions, cook any kind as occasion may require. As in baking, select the potatoes for boiling of a uniform size. This is to insure all being cooked at a time. Wash and scrub them. Pare, and cover with cold water. Put them in boiling salted water, using one quart of water and one tablespoonful of salt for six large potatoes. Cook until done, which will be in half an hour or a trifle over. Drain off every drop of water. Place the kettle, uncovered, at the back of the stove to let the water pass off in steam. Shake gently, and serve the potatoes very hot.

Potatoes, when pared, turn brown if exposed to the air, and each should be covered with cold water as soon as pared, and should not be pared long before using. If they are left, even a short time, uncovered after paring, the action of the air will turn them brown, and they will not lose this discoloration in the cooking, so they are not so appetizing. They should be taken up the moment they are done; this is one of the most important steps of all. When a fork will pierce them easily they are ready; drain them, too, at once.

And now, since some of you may like to vary your plain boiled potatoes, we will see what else may be done with it, and how it may be served

to be more tempting. Of course there is always "mashed potato," which is very nice when well prepared, and not at all good when carelessly done. It is like so many simple things; a little more thought and a trifle more labor, turn into success what might prove a failure. To one pint of hot boiled potatoes, add one tablespoonful of butter, one half teaspoonful of salt, a dust of pepper, and enough hot milk to moisten. Mash in the sauce-pan in which they were boiled; beat with a fork until light and creamy, then turn out carefully and lightly into a hot dish.

Sometimes there is mashed potato left over, and it can be made very nice for breakfast by using it for potato cakes, which are prepared in the following way: Make the cold mashed potato into small round cakes about one half an inch thick. Put them on a baking tin, and brush them over with milk; then bake in a hot oven until the cakes are a golden brown.

If you like a more ornamental dish than you will get with simple mashed potato, you may, when the potatoes are mashed and beaten and seasoned, rub them with a wooden masher through a strainer into a hot dish and then you will have "rice potatoes."

Having learned how to cook the potatoes by boiling, you can undertake other vegetables, but there are some general rules that you may first learn. And first about the preparation, which is always important:

Potatoes: scrub and pare when necessary. It is not always necessary to pare new potatoes, and the thin, delicate skin, not yet grown tough, will come off by rubbing.

Parsnips: scrub till white, and trim off the fine, thread-like roots.

Carrots: scrub, and scrape off the thin outer surface.

Turnips: scrub, cut in slices and pare.

Beets: wash carefully, for if the skin be broken the sugary juices will escape.

Cabbage and cauliflower: trim and soak, top down, to draw out any insects.

Celery: wash and scrape off any rusty portions.

Spinach and other greens: pick over very carefully, and wash in several waters.

Onions: peel and soak.

Green corn: husk with clean hands, but do not wash it.

Peas and beans: shell with clean hands and wash quickly.

Soft-shell squashes: wash, pare, and cut as desired.

Hard-shell squashes: wash, split, and cook in the shell.

Asparagus: wash, and break off the tough ends, tie in bundles, and break into inch bits.

String beans: strip off the ends and strings on each side, cut or break into small pieces and wash.

Fresh vegetables do not require any soaking in cold water, and it is better not to prepare them until you are ready to cook them. But if they are wilted, soaking will freshen them, and if they must be prepared long before cooking, they should be covered with cold water to prevent them from wilting or from becoming discolored.

For all fresh green vegetables use soft water, salted and freshly boiling. Cook rapidly until soft. The time will depend upon the age or freshness of the vegetable.

With green peas, shelled beans, green corn, asparagus, celery and spinach, use as little water as possible, and let it boil away, leaving just enough to moisten and thus save all the desirable soluble matter that may have been drawn out.

Cook cabbage and cauliflower uncovered, in a large kettle of rapidly-boiling, salted water, with a salt-spoonful of soda in it.

Onions, scald and change the water twice.

All others, cook in water enough to cover, and drain it off after cooking.

Green summer squash, cabbage and other watery vegetables should be pressed in a cloth or strainer, and well drained.

And now the ways of preparing the vegetables being quite understood, the next thing in order is the time of cooking. The following formula for boiling meats and other things besides vegetables, is given the pupils to learn.

Eggs (soft), coffee, clams, oysters	3 to 5 minutes
Green corn, small fish and thin slices of fish	5 to 10
Rice, sweet breads, peas, tomatoes, asparagus, hard boiled eggs	15 to 20 "
Potatoes, macaroni, squash, celery, spinach, cabbage	20 to 30 "
Young beets, carrots, turnips, onions, parsnips, cauliflower	30 to 45 "
String beans, shelled beans, oyster plant	45 to 60 "
Winter vegetables, oatmeal, hominy and wheat, chickens and lamb	1 to 2 hours
Fowls, turkey, veal	2 to 3 "
Corned beef, smoked tongue, beef à la mode	3 to 4 "
Ham	4 to 5 "
Small pieces of meat, allow fifteen minutes to warm through, then for every pound	15 minutes
Halibut and salmon, in cubical form, per pound	15 "

Blue fish, bass, etc., per pound	10	"
Cod, haddock and small fish per pound	6	"

For the benefit of the mothers who may think either I or the cooking school have gone astray on the matter of cooking cabbage, I want to emphasize here the advantage of the new way over the old. I was as sceptical over the notion of cabbage being properly cooked in half an hour, as any one of you can be; but my first experiment corrected me, and all who tasted this maligned vegetable served after the new method declared themselves surprised.

Have plenty of salted, boiling water, in which a teaspoonful of soda has been dissolved, plunge the cabbage in, top downward, leave it uncovered and let it boil until tender, that will be, as given in the time table, from twenty minutes to half an hour. Take it out into a colander, drain well, put into a hot dish, put in bits of butter, some salt and pepper, and serve at once. It will be as delicate as cauliflower; the color will be retained and there will not be an unpleasant odor over the house, such as is always associated with boiling cabbage. Try it once, and then see if the School Kitchen Learning

has not gotten several steps in advance of your old, traditional methods.

And now for the seasoning after once the vegetables are cooked. One pint of vegetables, mashed or sliced, or one pint of small whole vegetables requires one tablespoonful of butter, one half teaspoonful of salt, and one half salt-spoonful of pepper. Squash, peas and beans are improved by one teaspoonful of sugar. Milk or the vegetable liquid may be used to moisten such as are too dry.

Eggs come naturally into a lesson in boiling, and so the way for doing them is given. For soft-boiled eggs, you will put the eggs in a saucepan, cover with boiling water, and let them stand from six to ten minutes where the water will keep hot, but not boiling. The white will be soft and jelly-like and the yolk soft but not liquid. Or if one prefers the white hardened while the yolk remains soft, the eggs may be cooked in boiling water about three minutes. If you wish the eggs hard boiled cook for twenty minutes in water just bubbling. The yolk will be dry and mealy and adjustable, where if it is cooked only ten minutes it will simply be hard and tough, and will not digest easily. Try these for yourself and see.

Sallie Joy White.

THE KOH-I-NÛR.

(Stories about Famous Precious Stones.)

THE Koh-i-nûr is the most ancient, the most illustrious, and the most travelled of all our diamonds. It is what is called a white diamond, but its color would be of the deepest crimson, if only one thousandth part of the blood which has been shed for it could have tinted its rays. It looms through the mist of ages until the mind refuses to trace further backwards its nebulous career.

It is to an emperor that we owe the first contemporary account of the imperial gem. In 1526 Baber, the Mogul conqueror, speaks of it as among the captured treasures of Delhi. But that was by no means the first time that it

mingled in the affairs of men. It was already "the famous diamond" in Baber's time, and a wild tradition would have us believe that it was found no less than five thousand years ago. If it were found then, and if it has been ever since the contested prize of adventurers, thieves and all sorts of marauders, we cannot be too thankful that forty-seven of those fifty centuries are mercifully hidden from us.

Sultan Baber was a great man, a mighty conqueror and a good writer. He has left full and minute journals of his long adventurous life, which take the panting reader through such a series of battles, sieges, conquests, defeats,

royal pageants and hair-breadth escapes, that at last one cries out with wonder, "Can this man have been mortal to have lived through all this?"

Baber came from good old conquering stock. His father was sixth in descent from Tamerlane the Tartar, and his mother stood somewhat nearer to Jenghis Khan. Following in the footsteps of his fierce ancestors, Baber invaded India, or as he himself complacently remarks: "he put his foot in the stirrup of resolution and went against the Emperor Ibrahim." Rushing down like a devastating whirlwind from his mountain fastnesses around Cabul, Baber fell upon the Punjaub, first striking down all that opposed him and then writing about it in his memoirs.

On the twenty-first of April, 1526, he encountered the army of Ibrahim on the field of Paniput. "The sun was spear-high when the contest began, and at midday they were completely beaten and my men were exulting in victory," says Baber. The Indian emperor was killed and his head was brought to the victorious Mogul. Immediately after the battle, the conqueror sent forward two flying squadrons to Agra and Delhi respectively to seize the treasures of the fallen king. The troop which went to Agra was commanded by Humayûn, the favorite son of Baber. It is with this troop and its doings that we are concerned, but what was found in the Hindoo treasury had best be told by the conqueror himself:

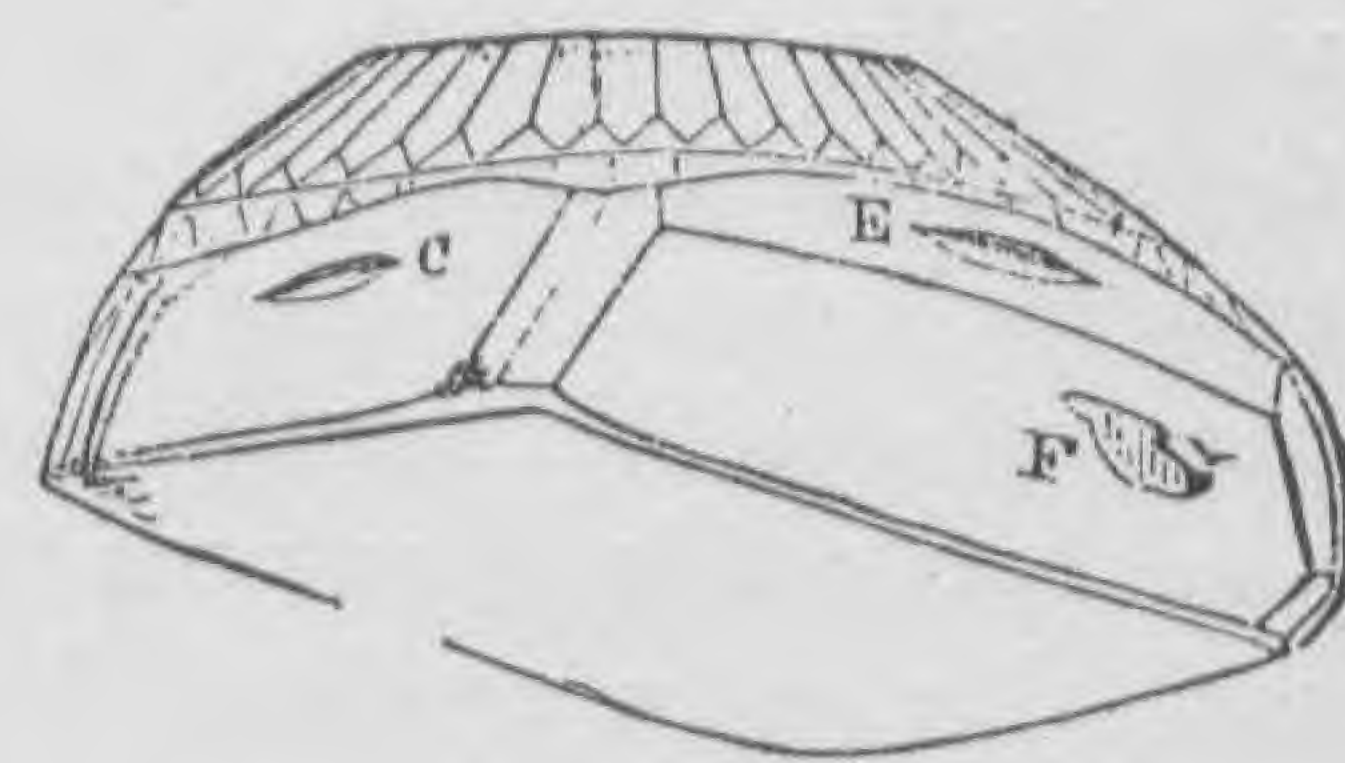
"Sultan Sekandar had made Agra his residence during several years while he was endeavoring to reduce Gwalior. That stronghold was at length gained by capitulation in the reign of Ibrahim: Shemsabad being given in exchange to Bikermajet the Hindoo who was Rajah of Gwalior for more than a hundred years.* In the battle of Paniput he was sent to Hell. [Incisive Mohammedan expression which signifies the death of an unbeliever.] When Humayûn arrived (at Agra) Bikermajet's people attempted to escape, but were taken by the parties which Humayûn had placed upon the watch and put in custody. Humayûn did not permit them to be plundered. Of their own free will they presented to Humayûn a *pesh kesh* (tribute) consisting of a quantity of jewels and precious stones. Among these was *one famous diamond* which had been acquired by the Sultan Ala-ed-din."

* Baber's meaning is obscure; probably he should have said "*whose family were rajahs, etc.*"

We may reasonably doubt how much of free will there was in the gift from a defeated Hindoo prince to his Afghan conqueror. Let us question this as we may, there is little doubt as to what diamond it was, although Baber gives it no name. The Sultan Ala-ed-din, to whom the imperial memoir-writer here refers, flourished a couple of centuries previously, and it is generally believed that he obtained "the famous diamond" in 1304 when he conquered the Rajah of Malwa in whose family it had been for ages.

How it eventually came into the hands of Bikermajet is not explained. But in the wild whirl of revolution and insurrection, which form the main staple of Indian history, many things get hopelessly mixed, and a diamond might easily turn up unexpectedly and be quite unable to account for itself. Baber goes on to relate that the great diamond—

we will antedate its name by two centuries and call it henceforward the Koh-i-nûr—was valued by a competent judge of diamonds "at



KOH-I-NUR, INDIAN CUT.
(186 carats.)

half the daily expenditure of the whole world"—an expression which for grandiloquent vagueness can scarcely be surpassed. Fortunately the same competent judge had not the weighing of the stone, or we should be befogged by some further Oriental hyperbole.

The emperor however says distinctly that the diamond weighed about eight mishkals, which being interpreted means about one hundred and eighty-six carats of our weight, or a little less than the Orloff and fifty carats more than the Regent. It is mainly on the evidence of the weight thus carefully recorded by Baber, that we identify the Koh-i-nûr, and can trace its subsequent career. On its arrival in England its exact weight was found to be one hundred and eighty-six and one-sixteenth carats, which agrees with the figure given by Baber as afterwards computed by dependable authorities. When we consider the extreme rarity of these great diamonds, coupled with the fact that no two stones are of exactly the same weight, we

may feel pretty safe in concluding that Baber's "famous diamond" and our Koh-i-nûr are one and the same stone, especially as henceforward its history is tolerably consecutive.

This magnificent gem the emperor gave to his beloved son Humayûn, who had very dutifully offered it to his father as tribute. It is somewhat painful to learn that Humayun rewarded this generosity by base ingratitude. The very next year we find Baber making this complaint:

"I received information that Humayûn had repaired to Delhi and had there opened several houses which contained the treasure and had taken possession by force of the contents. I certainly never expected such conduct from him, and, being extremely hurt, I wrote and sent to him some letters containing the severest reprehension."

It was surely not a comely action in the man who had received the Koh-i-nûr as a gift from the hands of his father, to plunder that father's treasure houses. Baber was at all events in full possession of his health and power and was abundantly able to enforce the obedience of his son. He again admitted Humayûn into favor, and four years later, namely in 1530, we find this fondly-cherished son languishing in mortal illness. The father was in despair, and sent him down the Ganges one hundred miles to Agra in hopes of benefiting him, but apparently to no purpose. A man of great piety was appealed to for his opinion, and he declared that in such cases the Almighty sometimes deigned to receive a man's most valuable possession as a ransom for the life of his friend. Baber declared, that next to the life of Humayûn, his own was what he held most precious in the world, and that he would offer it up as a sacrifice. His courtiers, aghast at the purport of such a vow, begged him to offer up instead "that great diamond taken at Agra," and reputed to be the most valuable thing on earth.

But the Koh-i-nûr, almost priceless as it was, Baber esteemed at a lower figure than his own existence. The self-devoted emperor walked thrice around the bed of his son, saying aloud: "I have borne it away, I have borne it away." Immediately thereafter he was observed to sink into illness, while Humayûn as steadily regained his health. So all Eastern historians of the

time declare, devoutly believing in the miracle. Perhaps we, more sceptical, may account for it by suggesting that both men, father and son, were suffering from Indian fever, and that the elder died, while the younger, thanks to the more robust constitution of his youth, was able to live through it.

Humayûn must have retained possession of the Koh-i-nûr during his adventurous life, for his son, the celebrated Akbar, appears to have bequeathed it in turn to his son and successor, Jehangir. This Jehangir was the most magnificent of all the Mogul emperors, or indeed it might be safely added of all the emperors of the world. He was a great admirer of diamonds of which he possessed a vast quantity. He must have inherited an immense number of jewels from his father Akbar, for in his memoirs he describes his crown, which he valued at a sum equivalent to ten millions of dollars, and which was composed exclusively of the diamonds and other jewels which Akbar had purchased.

This seems to establish the fact that the Koh-i-nûr was not incorporated in the imperial crown. It may possibly have been one of those magnificent diamonds which he used so lavishly in the adornment of his renowned peacock throne, the value of which amounted, according to his own estimate, to the unheard-of figure of forty millions of dollars. Some writers indeed go so far as to assert that the Koh-i-nûr was one of the eyes of that stupendous peacock, which was entirely composed of precious stones, and whose out-spread tail overshadowed the throne of the Moguls. According to them, too, the Orloff diamond was the other eye. But this is clearly a mistake; we have already seen where the Orloff came from — a thousand miles and more from Delhi.

It seems most probable that the peerless stone was worn as a personal ornament. There is extant an interesting contemporary print, which represents Jehangir decked out with a profusion of large pearls, in addition to which he wears around his neck a long string of various jewels. In the center of this chain hangs one stone of such exceptional size that it may well be the Koh-i-nûr. This however is only conjectural. Terry, the author of the print, chaplain to Sir Thomas Roe, who was sent on an embassy from

James I. to the Grand Mogul, does not mention the Koh-i-nûr by name. He merely observes that the Emperor was in the habit of wearing around his neck "a string of all his best jewels," and since the Koh-i-nûr was undoubtedly the finest diamond then known, and was apparently in his possession, it is more than probable that it would figure in the necklace.

Jehangir's empress was the celebrated Nûr Jehan (Light of the World), a princess famous alike for her beauty and her wisdom. The emperor says in his autobiography that she had the entire management of his household and of his treasure, whether gold or jewels. He might have justly added that she had the entire management of himself also, for he was completely under her influence. This beautiful Light of the World must have been uncommonly fond of jewels, as the emperor says that he had to give her thirty-five millions of dollars at their marriage to buy the needful jewels. Also Nûr Jehan is said to have invented the now world-famous perfume, attar of roses. Toward the end of Jehangir's life the Koh-i-nûr and all his other diamonds, we are told, ceased to charm, and he no longer desired to possess them. Even of diamonds, it appears, one may have a surfeit.

Shah Jehan, son of Jehangir, ascended the throne of India in 1627 and was if possible more addicted to jewels than his father. He caused basins of diamonds to be waved over his head in order to avert evil. This sort of incantation seems to have failed of its purpose in his case for he was dethroned and imprisoned by his rebellious son, Aurung-zeb, who kept him in confinement during the last seven years of his life. His diamonds and his daughter, Jihannira, were left with him to keep him company and amuse him during these tedious years.

Aurung-zeb, who, for an Eastern potentate, was rather short of jewels, sent one day to his father to get some of his diamonds in order to adorn his turban which could boast of but one great ruby. The imprisoned Shah Jehan exclaimed in his wrath that he would break all his gems to atoms sooner than let his undutiful son touch one of them. He further intimated that the hammers were kept in readiness for this purpose. His daughter prevailed upon him to

spare his glittering pebbles, and so the Koh-i-nûr escaped an ignominious death.

The same princess offered a basin full of diamonds to Au-rung-zeb when he came to see her in her palace prison after the demise of their father, and thus the Koh-i-nûr came to adorn the brow of another emperor. For nearly a century after this event the Koh-i-nûr dwelt tranquilly in Delhi, adding the lustre of its rays to the turbans of the Mogul empress until the awful year 1739.

Mohammed Shah, a feeble irresolute man, was appointed by fate to hold the sceptre of India at the moment when she was to meet her fiercest foe. Thamas Kouli Khan, better known as Nadir Shah, had raised himself to the throne of Persia and, like all usurpers, felt the need of strengthening himself at home by a successful foreign war. He accordingly invaded India, at the head of a small force of hardy fighters, who, in the words of Nadir's grandiloquent Persian biographer, "threw the shadow of their sabers across the existence of their foes." In short they killed all before them and entered the Punjaub early in the year 1739, by pretty much the same route as that followed by Baber, the ancestors of the Moguls. But the Moguls were changed since the days of Baber. Mohammed Shah was completely defeated the moment he encountered Nadir Shah.

However, booty, rather than territory, was the object of the invader, so he did not dethrone Mohammed, but only levied tribute from him. The defeated Mogul gave an unheard-of quantity of jewels to Nadir Shah "who was at first reluctant to receive them, but at length consented to place the seal of his acceptance upon the mirror of his request." Such reluctance is very foreign to the generally rapacious and grasping character of Nadir Shah, and probably existed only in the flowery imagination of the writer of his life.

Having become aware that the Koh-i-nûr was not among the treasures he had already sealed with his acceptance, Nadir Shah set about hunting for it, and at last a traitor was found who betrayed the secret of its hiding-place. A woman from the harem told the Persian king that the coveted diamond lay hidden in the folds of Mohammed's turban, which he never took

off. Nadir accordingly one day invited his helpless friend, Mohammed, to exchange turbans with him in sign of their everlasting friendship. As in the time of the first free-will offering to Baber two centuries before, the Koh-i-nûr was once again to pass from the conquered to the conqueror, from the weak to the strong.

It is said that Nadir Shah, overjoyed at the beauty of the gem he had thus cleverly filched from his ally, called it "Koh-i-nûr" (i. e. the Rock of Light) the first time that he laid eyes upon it. If this is really a fact it is very singular. It is indeed strange that Jehangir, who was so fond of descriptive names compounded with Light, should have left it to the enemy of his race to endow one of his favorite diamonds with this poetical title. One would prefer to

unhappy head. But even this expedient failed to make him give up his priceless gem.

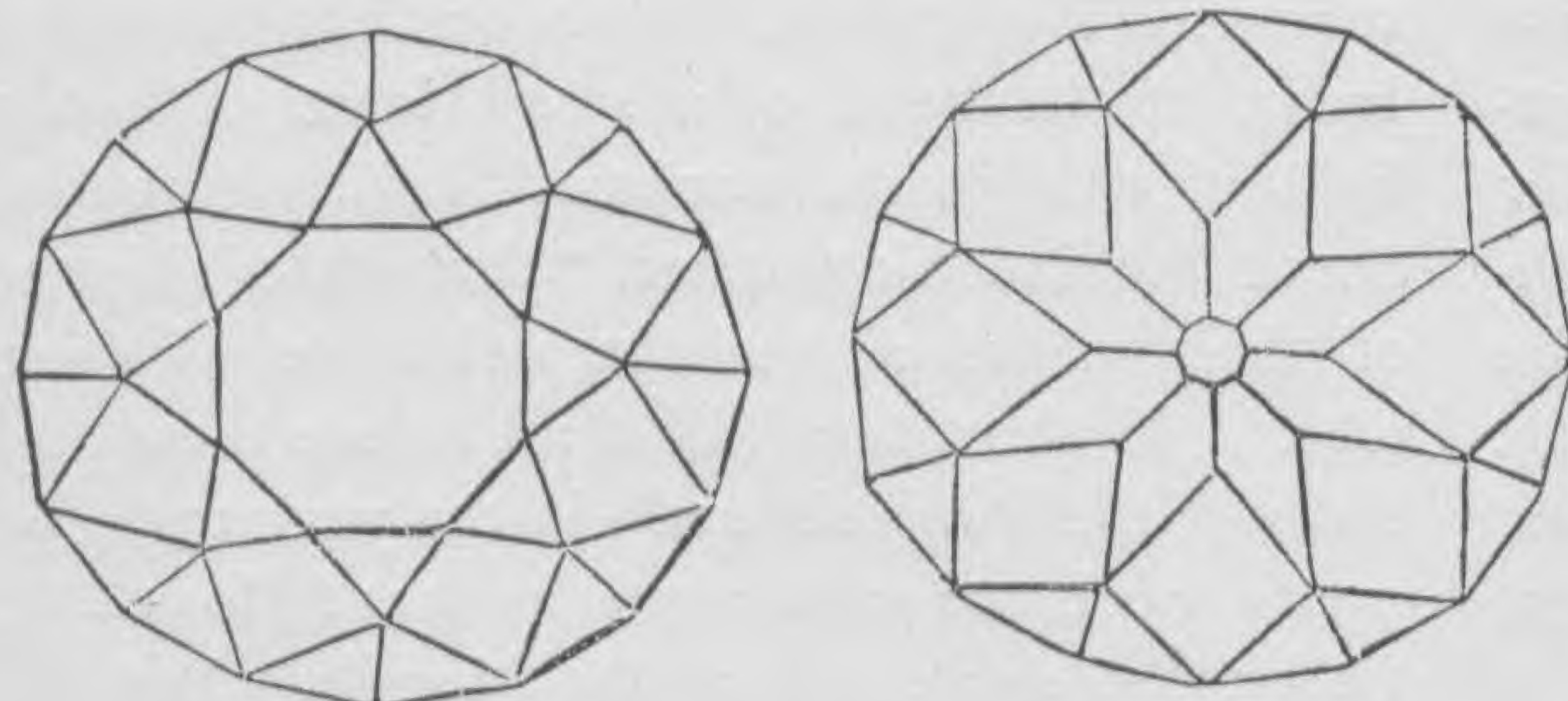
A powerful neighbor, the lord of Kandahar, an old friend of his father, now came to Shah Rokh's assistance, put his tormentor to death, and once more placed the forlorn prince upon his tottering throne. In reward for this timely service, the Persian gave to his deliver the Koh-i-nûr in whose rays his sightless eyes could no longer rejoice. Shortly afterwards he died from the effects of his injuries.

The Koh-i-nûr was now in Afghanistan, the birthplace of Baber, while Baber's descendants on the throne of Delhi helplessly mourned its loss. It went from father to son safely enough for two generations in the land of the Afghans, and then its evil spell began to work once more.

In 1793, just after its rival, the Regent, had been lost and found in the midst of the French Revolution, the Koh-i-nûr passed by inheritance into the hands of Taimûr Shah, the king of Cabul. He left it along with his crown and his kingdom to Raman Shah, his eldest son. Raman had enjoyed the triple inheritance for only a few years when his brother rose in arms against him, and being successful, as most rebels are in Afghanistan, followed the old established etiquette of the Cabul royal family:—the messengers of Shah Shuja, the triumphant rebel, met their deposed sovereign on his way to the capital, and they put out his eyes by piercing the eyeballs repeatedly with a lancet.

This done, Shah Shuja sat himself down to enjoy the sweets of Asiatic power. The Koh-i-nûr was not immediately his, however, for it was some time before it came to light, and then by the merest accident. An officer, happening to scratch his finger against something that protruded from the plaster in the walls of the prison of poor blinded Shah Raman, turned to examine the cause of the wound. To his amazement he discovered it to be the corner of the great diamond, which the unlucky prisoner fancied he had securely hidden away. Shah Shuja wore the Koh-i-nûr in a bracelet during the brief splendor of his reign, and it was on his arm when English eyes first saw it.

Mountstuart Elphinstone, the pioneer of the



UPPER SURFACE.

UNDER SURFACE.

KOH-I-NUR, AS RE-CUT.

think that he had called his diamond the Rock of Light just as he had called his wife the Light of the World.

Upon the retreat of the conqueror the diamond was carried off with other booty. The Koh-i-nûr therefore went from Delhi into Persia, and eventually it descended to Shah Rokh, the hapless son of the mighty Nadir Shah. But he who would wear the great diamond in peace must himself be strong, and Shah Rokh was weak. The wretched prince was unable to hold the throne, usurped by his father, against the usurpations of his own lieutenants. In 1751 he was dethroned and his eyes put out by Aga Mohammed, who endeavored by the most frightful tortures to force him to give up his diamonds and other treasures. Shah Rokh however, in spite of all, still retained the Koh-i-nûr and his tormentor thereupon devised for him a diadem of boiling pitch and oil which was placed on his

weary throng of Englishmen who have trod the road to Cabul, thus speaks of the Koh-i-nûr and its possessor to whom he was accredited as ambassador in 1812:

"At first we thought the Afghan was clad in an armour of jewels, but on closer inspection that appeared to be a mistake. His real dress consisted of a green tunic with large flowers in gold and precious stones over which were a large breast-plate of diamonds shaped like two flattened fleurs de lis, and an ornament of the same kind on each thigh; large emerald bracelets on the arms above the elbows and many other jewels in different places. In one of the bracelets was the Koh-i-nûr, known to be one of the largest diamonds in the world. There were also some strings of very large pearls put on like cross belts, only looser."

Shah Shuja met with the fate he had meted out to his elder brother, and in his turn was blinded and dethroned by his younger brother, Shah Mahmûd. The two blinded Shahs, united by a common misfortune, escaped together over the border and were doubly welcome at the court of Runjeet Singh, the fierce ruler, who goes by the name of the Lion of Lahore. The unhappy brothers did not come empty handed. Shah Shuja had managed to bring away with him an immense amount of jewels; hence the joy of Runjeet Singh, who had a passion for diamonds.

On the second day after his entrance into Lahore, Shah Shuja was waited upon by an emissary from Runjeet, who demanded the jewel in the name of his master. The fugitive monarch asked for time to consider the request, and hinted that after he had partaken of Runjeet's hospitality he might be disposed to listen to his demands. But the Lion of Lahore was in too great a hurry to lay his hands upon Shuja's diamond to think of hospitality. On the contrary he treated the Shah as a prisoner, separated him from his wife, and acted with extreme harshness towards the latter. He even tried to starve the poor Begum into giving up her diamonds. He fancied that he had succeeded, and, in great delight, spread out before some knowing persons, the gems which his cruelty had extorted from the luckless queen, asking them which was the Koh-i-nûr. Great was Runjeet's disgust when he was told that the famous diamond was not among the lot.

Shah Shuja speaking of the final transaction says:

"After a month passed in this manner confidential servants of Runjeet at length waited on us and asked again for the Koh-i-nûr, which we promised to deliver as soon as the treaty was agreed upon between us."

A couple of days after this interchange of preliminaries, Runjeet appeared in person, and was full of friendship and promises. He swore by all manner of things to maintain inviolable a treaty to the following effect:

"That he delivered over certain provinces to us and our heirs forever, also offering assistance in troops and treasure for the purpose of again recovering our throne. He then proposed himself that we should exchange turbans (ominous precedent!) which among the Sikhs is a pledge of eternal friendship, and we then gave up to him the Koh-i-nûr diamond."

After which, let it be remarked, Runjeet broke all his promises.

The actual ceremonial of the delivering up of the Koh-i-nûr is graphically described by an eye-witness of the scene, who says that the behaviour of Shah Shuja throughout the entire proceeding was dignified and impressive.

On the appointed day, namely June 1, 1813, the Rajah accompanied by several experts—he was determined there should be no mistake this time—proceeded to Shadera where Shuja was residing. The two potentates sat in profound silence for one whole hour, neither being disposed to speak first. Runjeet Singh was consumed with impatient desire to see the Koh-i-nûr, so at length he hinted to an attendant, who in turn hinted to Shah Shuja the purpose for which they were all thus solemnly assembled. Shuja, silent still, nodded to a servant, who speedily placed upon the carpet a small casket. Then again a tremendous silence ensued which Runjeet bore as long as he could, and at last he nodded to a servant to open the casket. The Koh-i-nûr lay revealed, and was recognized by the experts as the true gem.

Runjeet, for the first time speaking, asked, "At what price do you value it?"

Shuja, answering from out of his woeful knowledge, said: "At good luck; for it has ever been the associate of him who has vanquished his foes."

Shah Shuja seemed to imagine the diamond to be a bearer of blessings. This is the common belief in India with regard to large diamonds, which are supposed to possess magic virtues; but Edwin Arnold, than whom there exists no better authority about Indian legends, distinctly states that according to a Hindoo tradition "a baleful influence" was ascribed to the Koh-i-nûr. "The genii of the mines, as it declared, enviously persecuted with misfortunes the successive holders of this treasure." Rapidly glancing over the history which we know he draws the conclusion that the tradition sprang up after the event.

To Runjeet Singh, at any rate, the Koh-i-nûr brought no misfortune. He wore it as a bracelet and it glittered on the old king's arm at many a Sikh durbar.

On his deathbed, the Brahmans who surrounded Runjeet tried to induce him to offer up the great diamond to the image of Juggernaut. The covetous priests were willing to run the risk of any amount of baleful influences, provided they could secure the Koh-i-nûr as a forehead jewel for their idol. Runjeet nodded his head, so the Brahmans averred; and on the strength of this dubious testamentary bequest they claimed the stone. The royal treasurer, however, less fearful of the wrath of the god than of that of the succeeding rajah, refused to give it up.

Kurruck Singh wore this symbol of royalty for a brief space and then died of poison to make way for a usurper, Shere Singh. This unlucky monarch was killed in a durbar as he sat on his throne in Lahore, and the Koh-i-nûr was flashing in his turban at the very moment when the assassin aimed the treacherous shot.

And now, last of all the Indian owners of the wonderful gem, we come to Dhuleep Singh, the infant son of Runjeet the Lion. It has been said that the Koh-i-nûr belonged ever to the strong; it was scarcely probable therefore that it would remain for any length of time in the feeble grasp of this child. Indeed, his elevation upon the throne of Lahore was a signal for all sorts of intrigues and machinations on the part both of those who were in power and wished to keep it, and of those who were out of power but wished to acquire it.

In the midst of all this turmoil a new and hardier race appears upon the scene. Lord Dalhousie annexes Lahore and the English flag floats for the first time over the Koh-i-nûr.

In March, 1849, the king of Lahore was formally deposed. The scene was short and business-like, very different from the stately Oriental silence between Runjeet Singh and Shah Shuja on the occasion of the last change of allegiance made by the fickle diamond. A crowd of natives, without arms or jewels, a few English officers, a man reading the proclamation in Hindustani, Persian and English, the boy-king affixing his seal to the paper with careless haste—that was all. The ancient kingdom of the Five Rivers ceased to exist, and its last king became an English gentleman with a large income.

As a token of his submission, the deposed prince was to send the Koh-i-nûr to the Queen of England. This was accordingly done, and the imperial gem of India passed to the crown of England, thus once more vindicating its traditional character. Again it has passed from the weak to the strong, from the conquered to the conqueror, but we may hope that it has left behind it in India all those baleful influences with which it has been credited.

When it came to England in 1850 the Koh-i-nûr was distinctly an Indian stone, as may be seen from the plate. It had a large flat top, irregular sides, and a multitude of tiny facets, besides which there were three distinct flaws *c*, *e* and *f*. It was, moreover, lacking in light; being scarcely more brilliant than a piece of gray crystal.

Yet, notwithstanding all these defects, it was a deplorable want of taste and of historic sympathy which dictated the re-cutting of this unique gem. Professor King, an unimpeachable authority on diamonds and the proper mode of treating them, says with reference to this stone:

"As a specimen of a gigantic diamond whose native weight and form had been as little as possible interfered with by art, it stood without rival, save the Orloff, in Europe. As it is, in the place of the most ancient gem in the history of the world, older even than the Tables of the Law, and the Breast Plate of Aaron, supposing them still to exist, we get a bad shaped, because unavoidably too shallow, modern brilliant; a mere lady's bauble of but

second water, for it has a greyish tinge, and besides this, inferior in weight to several, being now reduced to one hundred and two and one half carats."

The operation of re-cutting the Koh-i-nûr was a very delicate and dangerous one. A special engine and mill had to be erected for it and a special workman, Mr. Woorsanger, was brought for it from Amsterdam. The work was executed in the atelier of the Crown Jewels and superintended by the Garrard brothers. Much interest was excited by the process and many people of distinction visited the workshop. One of these visitors asked Mr. Garrard what he would do, supposing that the Koh-i-nûr should fly to pieces during the cutting—a contingency that some had feared likely. Mr. Garrard answered: "I would take my name-plate off the door and bolt."

The Prince Consort placed the diamond on the mill, and the Duke of Wellington gave a turn

to the wheel. Thus launched, the work went on steadily, and at the end of thirty-eight days Mr. Woorsanger handed the new brilliant to his superiors.

The cutting of the Regent took two years by the old handmill process, and it had no deep flaws to eradicate, as was the case with the Koh-i-nûr. To grind out these flaws the wheel made no less than three thousand revolutions per minute.

The Koh-i-nûr still retains its Oriental name, though it has so unfortunately been forced to abandon its Oriental shape. It is now set in a brooch which the Queen wears upon all state occasions. It is kept at Windsor, so as to be at hand when wanted, and considerable interest in high quarters is required to get a sight of it. An exact model of it reposes in the jewel case of the Tower, alongside of the Crown, in order to gratify the curiosity of Her Majesty's subjects.

Mrs. Goddard Orpen.

SOME ODD FISH.

(Geological Talks.)

FLORIDA is an old-fashioned land. A day or two ago I was at the grocery store when a "Cracker" boy came in (a "Cracker" is a native Floridan). He had fish for sale and showed a number of strings of good large fellows. All of them but one were "mulletts." The odd one caught my eye at once.

"Halloo," said I, "where did you catch that, and what do you call it?"

"Why, sir, that yer is a mud-fish or a dogfish—some folks calls 'em the one, and some calls

I had seen mud-fish—properly called *Amia*—in bottles in museums and had tried to get one all the time I was in Iowa, for they occur there too, I am told. It is a really old-fashioned fish.



FIG. A.



FIG. B.

(a.) Heterocercal tail of old-fashioned plated ganoid—vertebral column to end. (b.) Homocercal tail of new-fashioned scaly fish; lobes nearly equal—no vertebral column in tail.



MUD-FISH OR DOGFISH.

'em the tother—and it 'us ketched in Dead River."

"Yes," said I, "that's what I thought it was."

Take any common fish, a trout or a bass, for instance, and examine it carefully. To begin with, look at its tail. It is extended into two lobes, an upper and a lower, of equal size. In the next place he is covered with neat thin horny scales that overlap like shingles on a roof. He has no neck either, nor anything like a neck, so he cannot move his head at all. He is like a man with his head pressed down between his

shoulders and soldered there firmly. Again, when our trout is taken out of water and thrown on to the grass, he flops and squirms and gasps and soon dies.

After he is dead we have him cooked — and what do we notice at once when we begin to eat him? He is full of bones; he has a skeleton of hard bones neatly joined together. If we had dissected our trout, instead of giving him over to the cook, we might have learned some other things about him. How does he breathe? There are openings at the sides of his head leading out from his mouth. In these openings are placed his gills, thin and delicate membranes very full of blood-vessels. These gills are borne on bony supports and are covered outside by horny gill-coverings lifting up only at their hinder edges. The fish takes in water through his mouth and forces it out over and through the gills and their openings. This water contains air and it contains free oxygen. This oxygen is needed by the blood of the fish. The little blood-vessels in the gills are filled with blood and as the water passes over the membranes the oxygen is taken up by the blood. So the fish breathes. We might find in the body cavity of our trout what is called the "swine bladder." This is filled with air, and is an aid to the fish in swimming, but has nothing to do with breathing at all. It is not a lung or anything like one.

Now let us look at our "dogfish," as shown in the picture. Notice his tail first of all. It is quite different from the trout. The backbone runs to its end. You can see the difference in the picture I have had drawn showing tails of the trout and the dogfish side by side. The boy who caught this dogfish tells me it lived for hours out of water. He caught it last night but it was still alive this morning. The trout would have been dead long before. On dissecting we see why it lived so long. Besides gills it has a bladder-like sac filled with air-cells. This air-sac is within the body cavity and connects with the mouth by a tube. It is a true lung, not so good as yours and mine, but a lung all the same. So though his home is in the water he can breathe free air and still live for some time. I think, too, that he can move his head a little on his body. Again we see that he is covered with

thickish round scales quite unlike the thin horny scales on our trout. More than this, he has thick heavy bones in his head. Certainly he is an "odd fish."

Two years ago one of my senior students brought me a fish caught in the Cedar River, Iowa. It was a shovel-nosed sturgeon. It was long and slim and its tail was remarkably developed in its upper lobe, while the lower one was largely lacking. It had no bones within, but its skeleton and the very curious long flat snout were made of "gristle" or cartilage that was of a most beautiful blue color. The mouth was on the under side of the snout and well back. It was a most remarkable mouth too — soft and fleshy and round and it could be thrust out so as to suck in food or could be drawn back so as to be scarcely visible. There were four curious little fleshy threads hanging down in front of the mouth — "feelers," probably. Five lines of heavy bony plates ran the full length of the body, and in front and behind, these completely cover the head and the back end of the body. Another very odd fish, you see — quite unlike the trout.

All of our common fishes have a skeleton of hard bones when they are grown, but when young they have a skeleton in which the parts are soft gristle or cartilage. In the trout the soft skeletons gradually harden and become bone. The shovel-nosed sturgeon, on the contrary, keeps its baby bones through life. Geologists say this is an "embryonic character." Bear that term in mind. It means that a grown-up animal has retained a baby character. In the lungs, the movement of its head, and some other characters, the dogfish or his allies are not like a fish, but are like a reptile — so we will call these reptilian characters. These odd fish may be said to possess some embryonic characters as the non-lobed or uneven-lobed tail, and the cartilaginous skeleton, and some reptilian characters, as the movable head and the lungs.

There are not many such "mixed forms" of fishes living nowadays. Besides the amia and the "shovel-nosed sturgeon," there are the different kinds of garpikes — long, slender fellows, quick in movement, voracious in character, covered from head to tail in thick, stout diamond-shaped plates neatly arranged in rows closely

fitting but not overlapping. The head is prolonged into a bill-like snout both jaws of which are armed with numerous sharp-pointed teeth. Whether amia can move its head or not, these fellows can easily. Next there are several kinds of sturgeons, some of them much larger than the "shovel-nose" and with plates of considerable size on the body. Then there is the great "spoon-bill" — which lives in our Cedar River and grows to a length of six feet or so, with his great flat spoon-shaped snout nearly one third the length of his body; also the curious Australian and African lung-fishes, whose lungs are far better than any of the above. All these odd fish, partly embryonic, partly reptilian in character, are called ganoids.

Now, leaving the fresh waters and our ganoids, let us look at a type of odd fish that live in the open sea. I refer to the sharks and their kin. Sharks are true fishes, but they are unlike either the trout or the dogfish. They breathe by gills, but they have no gill-covers. The water taken in at the mouth is, after passing over the gills, forced out through narrow slits of which there are several pairs at the sides of the head. These slits are long and narrow and vertically placed. The mouth is on the under side of the body, the skeleton is of cartilage and the tail is very unequally lobed — the upper lobe being very greatly developed. But there is no neck, no head movement and no lungs.

The most interesting of the sharks, to us, lives in Australia. It is called the Port Jackson shark. It is remarkable in two respects — first, in its curious teeth; second, in its fin-spines. The teeth in most kinds of living sharks are sharp and adapted for cutting. They do not form a single set like ours, but there are many sets, one behind another, perhaps a dozen series in all. In the Port Jackson shark however both the floor and the roof of the mouth are covered with flat teeth adapted for grinding and crushing. Such teeth are called "pavement teeth." The "fin-spines" are long sharp-pointed spines, somewhat curved, which are so placed in front of the fins as to be of some value as weapons. Sharks are a "mixed type," reptilian in their eggs, embryonic in their heterocercal tail and cartilage skeleton.

To-day ganoids and sharks are not the com-

moner types of fish. Out of ten thousand kinds of fishes now living not more than two hundred perhaps are of these two groups.

There was a time however when there were no fish like our common bony fishes of to-day — all had cartilaginous skeletons and uneven tails and were inclosed in a covering more or less complete of plates or hard enamelled scales, or else were sharks of the Port Jackson type with great fin-spines and pavement teeth. To-day the ganoids and the cestracious sharks are old-fashioned types. Florida still contains many antique forms of animals and plants. That is why I call it an "old-fashioned land."

Now that you have the three types of fishes clearly before you — the ganoids, the sharks and the bony fishes — we will see what has been their history in the world. We may know it by remains found in the rocks. Scales, bone-plates,

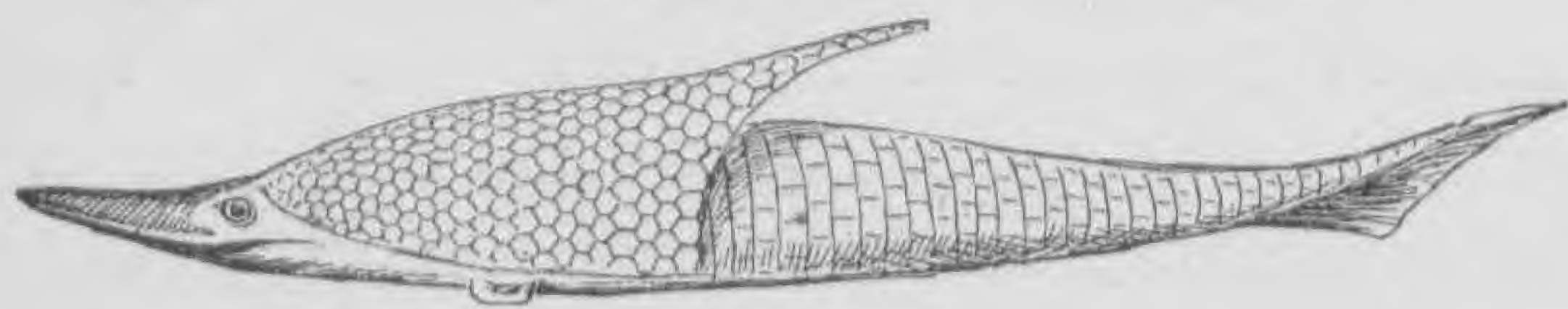


PORT JACKSON SHARK.

fin-spines, teeth and skeletons are preserved in stone. Go with me to our LeGrand Quarries here in Iowa. Sandstone and oölite and marble are here. All might teach us interesting lessons. But there is one layer in particular I wish you to see. Last spring I spent a whole day at work on it. The quarrymen call it "the spotted layer." It is a queer gray and purplish mottled limestone. Here is a great pile of blocks of it quarried out. See this jet-black spot. It is very brittle and its lustre is richer than any Japanese lacquer. It has a curious fibrous structure and a minutely dotted surface. It is more or less flat below and rounded above. In shape it is a little like an old wooden button. It is a "pavement tooth" of an old-time shark.

In this next block is a delicate and brilliant fin-spine, a little one, only an inch or two long. It is nearly triangular in cross-section and is longitudinally marked by delicate raised lines. It takes time and trouble to remove these whole. Careful work with a little chisel and a light hammer is necessary; and often, just as it is nearly

out—"crack!"—it flies to pieces and is lost. Some beauties have been taken from here—great pavement teeth, which show perfectly how much was sunk into the jaw and how much was above; elegant block spines eight inches and



PLACODERM.

more in length, covered with smooth round tubercles perfectly japanned; and cutting teeth of sharks with five or more cutting cones.

The history of the long-ago past can be read in these remains as really as the history of Egypt may be read in her monuments. The hieroglyphs waited centuries for Champollion; the rocks of Scotland waited ages for their interpreter. A quarryman, in such a quarry as ours at LeGrand, a stone mason, Hugh Miller, made known to the world the *Testimony of the Rocks*. He had become interested in the strange bucklers and plates and scales that his chisel uncovered. Many an hour of leisure he spent on holidays and after hard days of labor in working out these unknown forms and in their careful study. His *Old Red Sandstone* introduced to the world of science these "odd fish," the oldest of their race then known.

Since then fossil fish, as old and older, have been found and now we can trace the family history of the fishes fairly well. What Miller did for Scotland Rev. Mr. Heizer has done for Ohio. Like all Methodist clergymen he moves often from place to place, and every locality he is set down in becomes a region for exploration. In the Ohio limestones he found great plates, jaws with teeth attached, fin spines and other remains that made known to us some veritable giants of the old-time seas. The most remarkable of these forms is one that has been named Dinichthys. The word means "terrible fish," and it is so surely. Nearly thirty feet long, its head measured more than a yard and was incased in a stout covering of strong bony plates fitting closely together. Its jaws were terrible instruments for cutting and tearing, being developed at the front into sharp beaks whose edges fit one another so as to cut like shears. Whether the

whole body of this monster was covered with great bony plates is uncertain. If not, the skin was doubtless thick and tough.

When Dinichthys lived there were probably no reptiles, birds or mammals. Almost all animal life was aquatic and fishes were the highest forms. These were numerous, however, and varied. There were no bony fishes, but only ganoids and sharks. Of ganoids there were two types—placoderms and lepidoganoids. The placoderms were fishes whose bodies were more or less completely incased in great plates like Dinichthys. Other forms smaller than the "terrible fish" were even more completely protected. Pterichthys (perhaps not really a fish) was entirely incased in firm bony plates and had strange wing-like projections or paddles, one on each side of the body. The head was bucklered. The pointed tapering tail was covered with smaller plates than those over the body. Another kind (cephalaspi) had a great bent crescent-shaped head-shield. Another yet, one of Hugh Miller's discoveries (coccosteus), had a great head-shield made up of many plates fitting into each other along irregular wavy lines. All the plates are covered with rounded or wart-like tubercles or projections. There are American species of this form known. All these forms are placoderms. There are no living forms of these. As a group they early disappeared.

The true ganoids of that date were more like our modern forms—the garpikes, the mud-fish and the lung fishes. In these, in place of great body plates fitted closely together so as to form a strong shield-like mass, we find scales more or less rhomboidal or diamond-shaped in regular arrangement, edge to edge, or else scales somewhat rounded and roughly overlapping. They had the one-lobed tail, the head moving more or



LEPIDO-GANOID.

less freely on the body, the rude lung and the imperfectly hardened skeleton of our shovel-nosed sturgeon. There were hundreds of kinds. Some, slender and fierce, shot rapidly through the water in search of their prey, while others,

heavier in build, less graceful in movement and more sluggish in character, lay in the mud at the bottom of the streams among the water plants and grasses that grew along the banks.

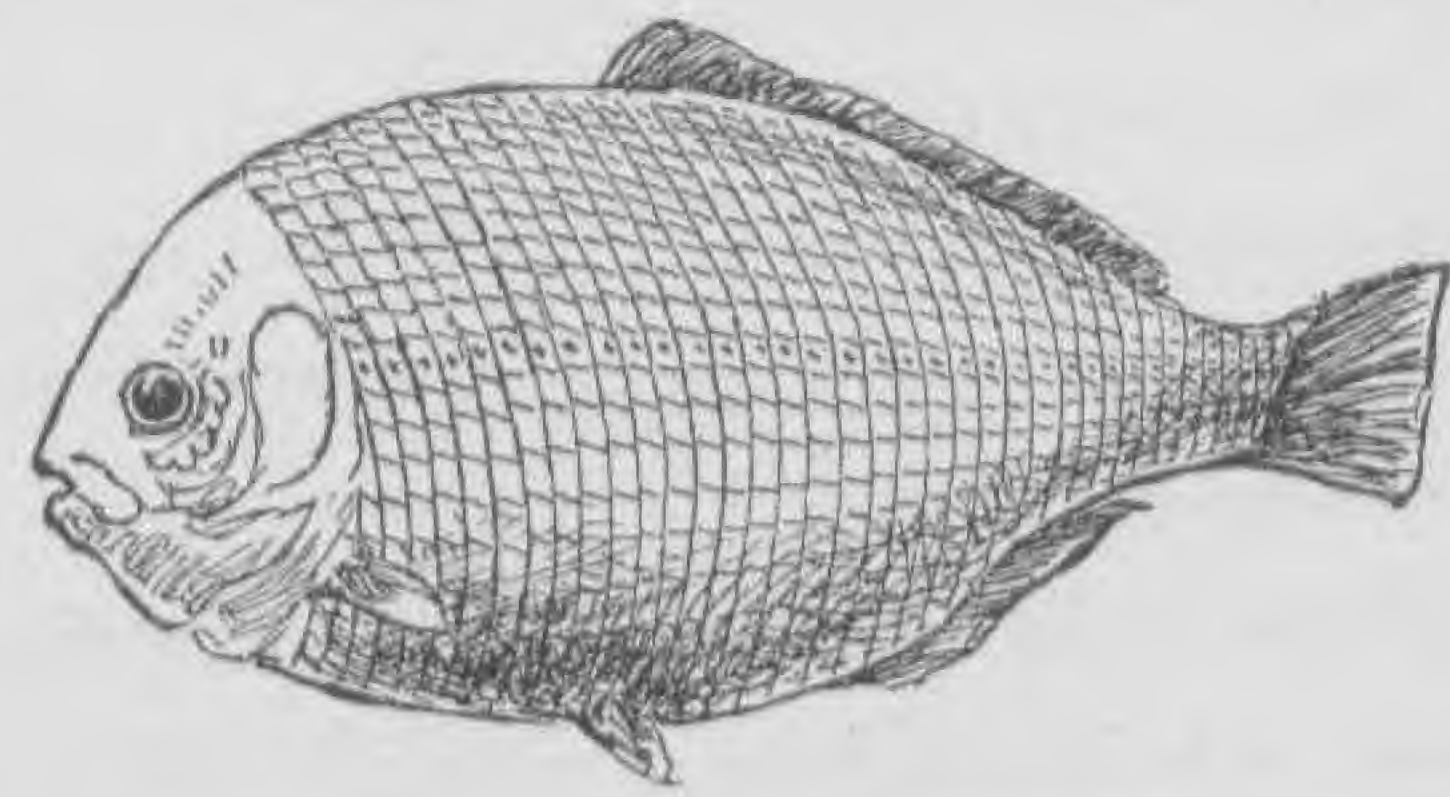
There lived sharks too, mainly of the Port Jackson type. Spines of a foot in length, of graceful form, serrated or smooth along the edges, and spiny-tubercled or uniform in surface, have shown us that giants of this kind then lived. Many species have been described. Pavement teeth, singly and in position, add their evidence.

These were the oldest fish — placoderms, the uneven-tailed ganoids and the pavement-toothed sharks. But they were not to remain the masters of the world. Their day passed. Reptiles began to appear; first as queer "mixed forms," half-fish, half-reptile, then as true reptiles. As these gained ground the old-time fish gave way. First the placoderms — mighty as some of them were — died out. Then true ganoids became less and less numerous, and those that lived were of a different type and had less uneven tails, less hard covering and more bony skeletons. As the ganoid life diminished the modern type of bony fishes appears, gains ground and at last prevails.

Meantime the older type of sharks began to be crowded out by a type with more conical and cutting teeth. These gain ground and in the time of mighty reptiles were the principal type.

Later on they were replaced by tremendous monsters whose triangular teeth measured two inches at base and five or six in height. Very different these savage monsters, terrors of the sea, seizing and tearing their prey with such weapons, from the old type crushing shell-fish and other low forms between its pavement of flat teeth. But even these giants are gone, and smaller, less fierce forms have usurped their place in our modern seas.

Fish life still remains in many thousand forms, but it tells a new story — trout and salmon and



GANOID.—TETRAGONOLEPIS.

cod are the typical forms. The old cestracient sharks, the dogfish, the shovel-nosed sturgeon, the spoonbill are "odd fish" to-day. They were well enough in their time — but their day and generation has gone by. They are as old-fashioned and out of place in this nowaday world as some old-time beau in his ruff and long coat, his knee-breeches and silver-buckled shoes, his powdered wig and cue, would be in a modern parlor.

Frederick Starr.

FROM MAHOMET'S DEATH TO FALL OF OMEYADS.

(Search-Questions in Mahometan History.)

61. Name the immediate successor of Mahomet, and state how long his rule lasted.

62. What formidable rebellion was crushed at the battle of Yemamah in his reign?

63. Up to the end of the first year of the Caliphate of Abu Bekr the Moslem conquests had been confined to Arabia; against what people did the Arabians now turn their arms?

64. What great army was defeated at Wacûsa in Syria by the Moslems?

65. Name the successor of Abu Bekr and the extent of his reign.

66. What great city was taken by Moslems in the summer of 635, after a six months' siege?

67. When was Jerusalem taken by the Moslems?

68. What great city which fell before the Moslems in 641 regained its liberty only to be re-taken by storm in 646?

69. Name the Persian city whose capture by the Moslems sealed the fate of the Persian empire.

70. What Caliph succeeded Omar?

71. Of what family was the third Caliph?

72. What important island was taken by the Moslems in Othman's reign?

73. In what did the unpopularity of Othman finally result?

74. What relation was Ali, the successor of Othman, to Mahomet?

75. Where was the "Battle of the Camel" fought, and what important woman was seated upon the camel?

76. What two rival Caliphs added to the prescribed daily service curses against each other?

77. What body of religious insurgents who refused obedience to any ruler but the Lord were defeated by Ali at Nehrwan?

78. After this defeat what did they conspire to do and what did they accomplish?

79. What Caliph abdicated his throne, and in whose favor?

80. What battle ended the rule of the Omayyad dynasty and in what year of the Hegira was it fought, and also in what year of our era?

ANSWERS TO JANUARY SEARCH-QUESTIONS.

21. June 28, 622.

22. During Mahomet's first half-year at Medîna he built the mosque and houses for himself and followers.

23. They were called Muhâjerin or "Refugees."

24. Ansâr, or Helpers.

25. Mahomet entered into a formal treaty with the Jewish tribes about Medîna; but as the Jews would not acknowledge the superiority of his faith, the alliance lasted but a short time.

26. Caravan traffic with the north. Leather, precious metals, gums, frankincense, were among the articles of export, and silks and articles of luxury were imported from Syria.

27. Attacks upon the caravans moving past Medîna on their way to and from Mecca.

28. The battle of Bedr was fought in January, 624, between the Coreishite or Meccan army, and that of Mahomet who gained the victory. It was the turning point in the early development of Mahometanism, which now assumed importance as a military as well as a religious force.

29. At the battle of Ohod, in January, 625.

30. The massacre of the Bani Coreitza, a Jewish tribe near Medîna whom Mahomet suspected of having given assistance to the Coreish.

31. By this treaty between Mahomet and the Coreish, war was to be suspended for ten years; perfect amity was to prevail; whoever wished to join one or the other party was at liberty to do so, and provided Mahomet should then retire from Mecca, he and his followers should be free to visit Mecca for three days the next year.

32. The conquest of Kheibar, one hundred miles from Medîna, upon which the Mahometans made an unprovoked assault.

33. At the time when according to the treaty of Hodeibabia, Mahomet and his exiled converts made the Omra or Lesser Pilgrimage to Mecca and performed the rites of their religion at the Kâaba.

34. A petty disturbance between two tribes near Mecca in which a tribe owning allegiance to Mecca attacked another under the sway of Mahomet.

35. The conquest of Mecca, on which occasion Mahomet displayed great magnanimity and moderation.

36. Tâyif.

37. One of the wives of Mahomet, and the mother of his favorite son Ibrahim, who died in infancy. She was of Coptic birth, and was sent as a gift to Mahomet by the Governor of Egypt.

38. Tuleiha, Museiama and Aswad. The last named is said to have been killed the night before the death of Mahomet.

39. June 8, 632.

40. In a tomb constructed in the house of his favorite wife Ayesha.

Oscar Fay Adams.



GOING TO MARKET.

(Cooking in the Public Schools.)

THE next lesson in cap and apron is on cooking meats; but before the meats are cooked they must be bought; and it is quite important that the cooks should know how to buy them. It is all very well to order hap-hazard of one's provision-man, but how is one to know whether she gets what she orders unless she has learned the different cuts of meat, where they are situated, and what she ought to pay for them?

So one day the school kitchen is deserted, and the class is taken by the teacher down to the big markets, and there they are initiated into the mysteries of rumps and rounds and loins, of shoulders and fillets, of briskets and rattle rounds, of ribs and flanks, of saddles and shins, and the rest of the long list of cuts, which all their lives they have heard talked about, without understanding or knowing one part from another.

Of course if one is going to be a good housekeeper one must know what to buy, and how to make the best use of what she buys. She must learn, too, to do her marketing according to the needs of her family. If she is providing for persons who do a great deal of out-of-door work she will want the heavier kinds of food. If for persons who are in-doors a great deal and whose work is sedentary, she will want to provide lighter food. Whether light or heavy it must be nourishing, but it will differ in quality.

In the buying of meat a lesson in economy is given. And now, my young housekeepers in prospective, don't turn up your noses at this word, and above all, don't get a wrong idea of the meaning of the term. The notion that prevails the most popularly is a very mistaken one. I have had occasion to talk about this very thing to older people than you, and I have found that

pretty nearly all of them had fallen into the same fault. Now please remember this—it is the very same thing I told them—economy does not imply meanness. It is only another word for good, honest thrift. It means doing the very best you possibly can with the money at your command. It is a moral obligation. It is care-taking in its best and highest sense. You will have respect for the word as soon as you settle it in your mind that it is not by any means connected with stinginess. So in learning about meats and the way to buy them to the best advantage, you are learning “economy” because you are taking lessons in wisdom of selection, and the ways to get the most good with the money you have to use. You will learn, too, when the different meats are in season, which is needed knowledge, as you will find when you come to be put to the test.

The first part of the lesson at the stall is about beef, and the market-man, who has come to know the bright-faced, eager-eyed girls very well, and evidently has an unbounded admiration for the teacher, has put down upon the table half a beef, and as the teacher explains he cuts, in order to show the different pieces as she names them. They have already taken a preliminary lesson from the diagram at the school, but it is more satisfactory to see the meat—they understand it much better.

Good beef, the teacher tells them, should be bright-red when it is first cut, and this red flesh should be well marbled with yellowish fat, and there should be a thick layer of fat on the outside. If it does not present this appearance, it is safe to assume that the ox was not well-fatted, was too young, or was not in good condition. All these things one can see for herself; by them

she will know when the beef is good. Also she is told that the flesh should be firm, and no mark should be left when it is pressed with the finger. The suet should be dry and crumble easily.

The first thing that is to be done, is to divide the beef into the hind and fore-quarters. The hind-quarter contains the finest and most expensive cuts of the meat. Here are found the sirloin, the tenderloin, the rump and the round. The cheapest portions of the hind-quarter are the shin and the flank. In the fore-quarter are the ribs, the shoulder, the shin, the rattle round and the brisket. The ribs are the top of the back nearest to the loin, join it, in fact, when the animal is whole. The first five ribs are what are called the "prime" ribs; these are used for roasts or steaks; the next are the five chock ribs lying between the prime ribs and the neck; the meat is of a finer quality than on the "prime" ribs, although they are used for the same purposes. The neck is used for beef teas, for stews, and for boiling. Below the rib-cuts, running along the side of the animal, is the rattle round. This is used for corning. The under

In the hind-quarter come the first roasts and steaks, as well as the juiciest meats for making beef tea, meat pies, beef à la mode or potted beef. Sirloin, of course, gives the very choicest roasts and steaks; next comes the rump; this is cut in three parts. The back, the middle and the face are good roasting pieces; but the most economical is the middle cut, as it is free from bone, and has not a scrap of waste on it. Good steaks are cut from the top of the round; some people go so far as to say that the flavor of a round steak is superior to that of any other. The lower portion of the round is used for braising and for beef tea.

The tenderloin has the most tender meat, but it is neither so juicy nor so well-flavored as other portions that are not so tender, and it is not nearly so nutritious as portions that require much cooking. The sirloin comes next in tenderness and delicacy. These cost more than any other cuts, but there is less nutritive value than is found in the cheaper parts. Indeed the cost of the meat seems to be in an inverse ratio to its real food-value. Of course this is so because

of the much smaller proportion of the so-called choicer cuts. It is one of the wise economies of nature that it should be so. The harder-working class of people, those who do a great deal of manual labor, and particularly those whose occupation takes them a great deal into the open air, need the nourishment and sustaining quality of the heavier meats. And these are found in the cheaper parts, particularly where there is a great deal of juice in the meat and rich marrow in

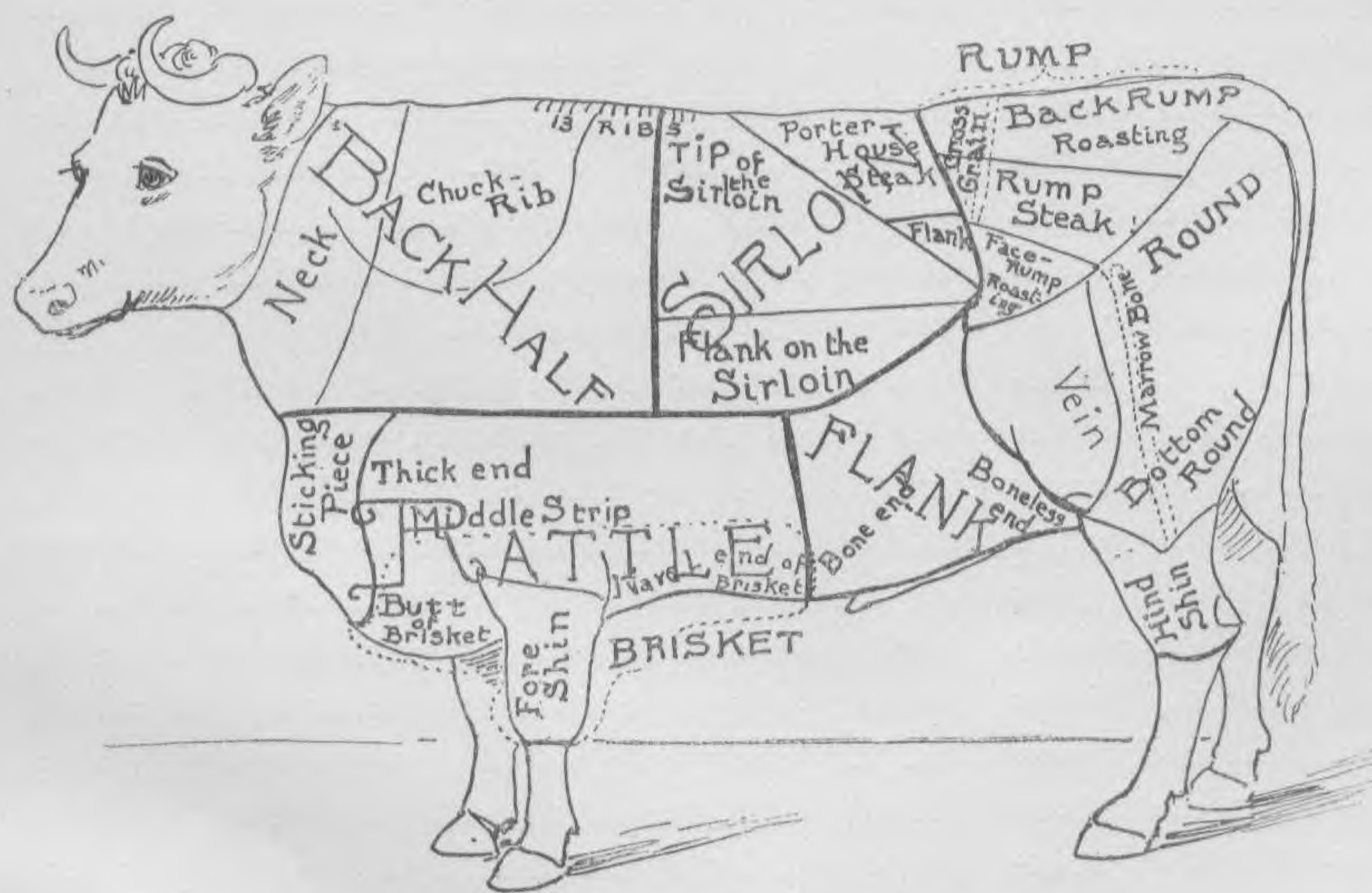


DIAGRAM SHOWING DIFFERENT CUTS OF BEEF.

(Furnished to WIDE AWAKE by Mr. F. G. Hawes, Boston.)

part of the animal's body is called the brisket, and this is also used for corning. The shoulder is used for steaks and corning, though the less said about the tenderness of a shoulder steak the better. The shin, both in the front and the back, is used for soups and soup-stock.

the bone. Stews, and braised meats, or those that are steamed in their own juices over the fire, as pot-boiled meats, give the most nutriment, and add the physical strength that is needed, as well as in cold weather supplying a deal of warmth by furnishing the carbon for the body.

In this last cause is found the reason why one cares less for food of this kind in the summer. Stimulation and heat are to be avoided when the weather is warm, and that is why vegetables and fish are more palatable in the summer than in the colder weather. One very important point to be learned is how one is to vary the foods to suit the seasons, and so come as nearly as possible to an ideal diet. It is not within the jurisdiction of these papers to dwell much upon these points, but perhaps the few hints given now and then will set you all thinking, and perhaps send you to the proper sources for all the necessary information.

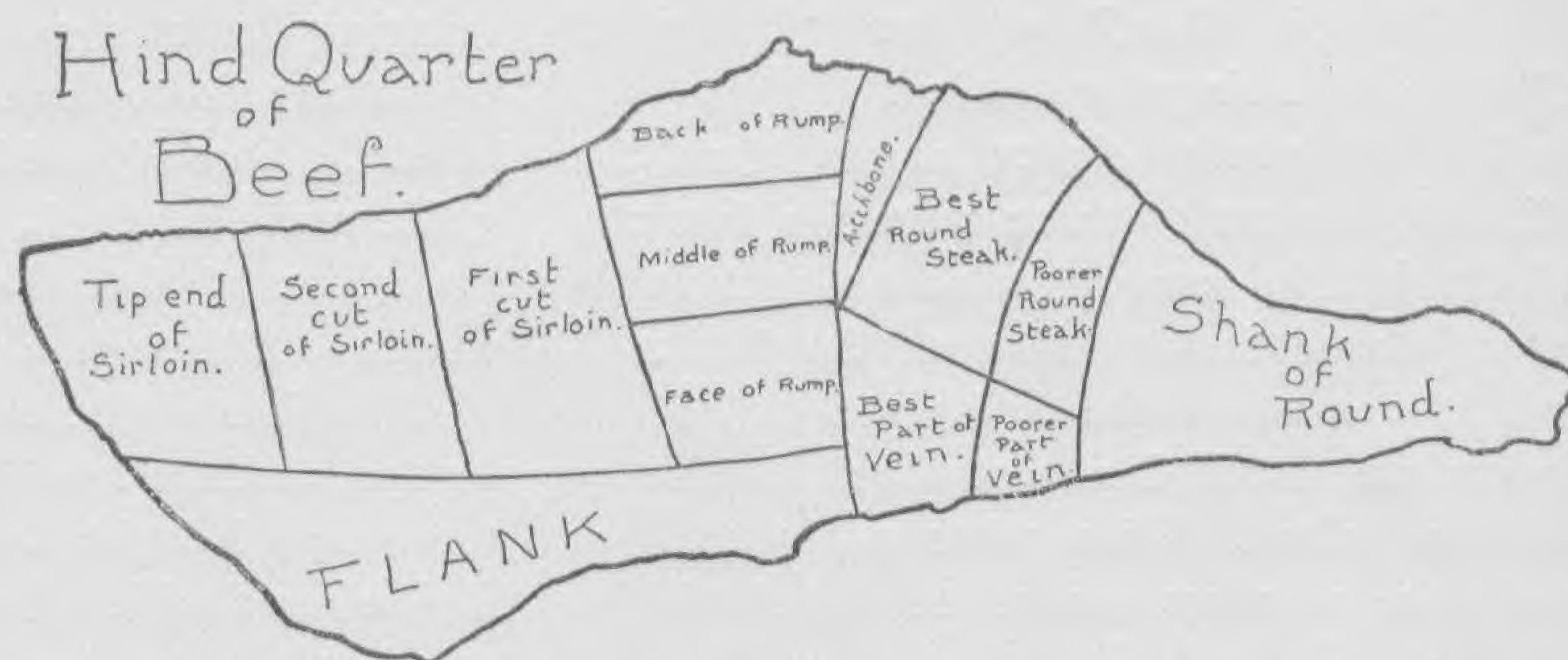
Mutton, like beef, is good all the year round, and the younger it is the more delicate. Still the nicer meat is gotten from a larger animal, and there should be a good deal of flesh on the bones. For buying lamb or mutton you may have the saddle, or the whole hind-quarter, the leg, the loin, and the shoulder. The saddle is roasted; the leg is roasted or boiled; the loin is roasted or cut into chops; and the shoulder is roasted.

The hind-quarter costs more than the fore-quarter; but the shoulder-piece, boned and stuffed, makes a very nice and inexpensive roast. The shoulder and neck piece are also used for lamb stews and fricassees.

Chops are cut two ways; there is the long chop and the short chop. The long chop has the flank-end left on, while in the short chop it is cut off and only the loin-part left. The long chop costs less by the pound, but really it is no cheaper since the flank-piece adds to the weight, and there is but very little meat on it. It takes

so much more to make the amount needed, that in the end it costs about as much as the lesser number of pounds of short chops.

The heart and liver of beef are both used for food, and the heart of mutton. The liver is either broiled or braised, and the heart is braised.



DETAIL DIAGRAM. (Furnished by Mr. F. G. Hawes, Boston.)

Only by experience can one learn to tell exactly the cuts when she sees them, and it would be a good thing if after the lesson on marketing the mothers would trust the daughters to buy some of the family supplies of meat, thus giving them the opportunity to put this lesson into practise. Of course they would begin with the cheaper prices, in which there is little risk, and every time they made a selection it would be an added lesson. Almost every family has its own market-man, and when he saw the interest, he would no doubt give the little purchaser a great deal of valuable information, thus supplementing what her teacher has given in this marketing lesson. There is no danger in putting a certain amount of responsibility upon a child; it makes her careful and thoughtful, and gives her a certain discretion that is a valuable addition to the character. I don't mean to make a little prig of her, for no one dislikes a prig worse than I, but a young girl can be thoughtful and useful and discreet without being priggish, and without losing any of the sweet youthfulness that is so desirable.

Sallie Joy White.



THE FRENCH BLUE.

(Stories about Famous Precious Stones.)

THE diamond variously known as the "French Blue," or the "Tavernier Blue," has had a singular destiny.

Smaller by nearly eighty carats than the Orloff, and younger by three centuries than the Koh-i-nûr, it is in some ways as remarkable as either of those famous stones. So far as is known, it was never the worshiped orb of an idol, nor the hardly-less worshiped bauble of an Eastern prince. Wars were not waged for it, nor were murders committed to obtain its possession. Indeed, its quaint commercial *début* into history is somewhat tame, as is also its uneventful life of a century and a half in the treasure-chambers of the Crown of France. In fact, were it not for its strange color, its strange loss and its yet stranger recovery, the French Blue would scarcely deserve a place among these "Stories about Famous Precious Stones."

Jean Baptiste Tavernier is a name familiar to every one who has studied the history of precious stones. He was the son of an Antwerp geographer settled in Paris, and early in life he evinced an ardent love of travel. Born in 1605, he had at the age of twenty-two traveled over most of Europe, and was acquainted with most European languages. In his own account of his travels he speaks entertainingly of the various reasons which at different times prompted him to journey. Having entered the service of the Duke of Mantua as captain of a company of soldiers, he attended that prince during the siege of Mantua. He was struck by two bullets which, though inflicting a troublesome wound, failed to kill him — thanks to the excellent temper of his cuirass; whereupon he observes that "he found a longer stay at Mantua did not agree with his desire to travel." He made his way to the East carrying with him a vast quantity of *cinque-cento** enamel work and jewelry,

which he sold to the Asiatic sovereigns, and bringing back a number of precious stones which he sold to the kings of Europe. He was, in fact, a sort of peddler among princes.

He made in all six journeys to India during the space of forty years, and amassed great wealth. Although a Protestant, he was ennobled by Louis XIV. on account of the services he had rendered to French commerce, and he thereupon bought the barony of Aubonne in Switzerland which he afterwards sold to Duquesne the great navigator.

Louis XIV. was one of his best customers and bought from him jewels and rich stuffs to the enormous amount of three millions of francs; about six hundred thousand dollars. It was on his return from his last voyage, namely in 1668, that Tavernier sold the Blue Diamond to Louis XIV. Unfortunately he does not give any particulars of the purchase of this stone, which is singular as he was a very chatty writer and filled his book with a quantity of delightful little passages beginning "I remember once." He describes at great length the Eastern manner of buying and selling diamonds which seems greatly to have impressed him, accustomed as he was to the noisy bartering of European markets. He says:

"'Tis very pleasant to see the young children of the merchants (at the diamond mines) from the age of ten to sixteen years, who seat themselves upon a tree that lies in an open space of the town (Raolconda, a diamond region near Golconda). Every one of them has his diamond weight in a little bag hanging on one side and his purse with five or six hundred pagods in it. There they sit waiting for any one to come and sell them some diamonds. If any one brings them a stone they put it into the hand of the eldest boy among them who is, as it were, their chief; who looks upon it and after that gives it to him that is next him, by which means it goes from hand to hand till it returns back to him again, none of the rest speaking a word. After that he demands the price so as to buy it if possible, but if he buy it too dear it is upon his own account. In the evening the children compute what they have laid out; then they look upon the stones and separate them according to their water, their weight and

* During the visit of the Prince of Wales to India a few years ago it was observed that some curious old jewels of Italian make appeared at the gorgeous pageants which the native princes ordered for the benefit of their future Emperor. It is thought that these were heirlooms dating from Tavernier's time.

their clearness. Then they bring them to the large merchants who have generally great parcels to match, and the profit is divided among the children equally. Only the chief among them has four per cent. more than the rest."

It may have been from some such sedate children that Tavernier bought the Blue Diamond. At the same time he mentions the Coleroon mine as the only one which produces colored diamonds, from which we may infer that "the Blue" hails from that locality. As Tavernier was well-known as a diamond-buyer who gave good prices, it is probable that he would get many proffers of stones from private persons. With regard to another large diamond which he bought in India, he has given a minute account of the transaction which may be taken as a fair sample of Asiatic bartering:

"One day towards evening a Banian badly dressed, who had nothing on but a cloth around his loins and a nasty kerchief on his head, saluted me civilly and came and sat down beside me. In that country (India) no heed is given to the clothes. A man with nothing but a dirty piece of calico around his body may all the same have a good lot of diamonds concealed. On my side, therefore, I was civil to the Banian and after he had been some time seated he asked me through my interpreter if I would buy some rubies. The interpreter said he must show them to me, whereupon he pulled a little rag from his waist-cloth in which were twenty ruby rings. I said they were too small a thing for me as I only sought for large stones. Nevertheless, remembering that I had a commission from a lady in Ispahan to buy her a ruby ring for a hundred crowns, I bought one for four hundred francs. I knew well that it was worth only three hundred, but I chanced the other hundred in the belief that he had not come to me for that alone. Judging from his manner that he would gladly be alone with me and my interpreter in order to show me something better, I sent away my four servants to fetch some bread from the fortress. Being thus alone with the Banian, after much ado he took off his turban and untwisted his hair which was coiled around his head. Then I saw come from beneath his hair a scrap of linen in which was wrapped up a diamond weighing forty-eight and a half carats, of beautiful water, in form of a carbuchon,* two thirds of the stone clear except a small patch on one side which seemed to penetrate the stone. The fourth quarter was all cracks and red spots. As I was examining the stone the Banian, seeing my close attention, said: 'Don't amuse yourself with looking at it now.

*This is probably a misuse of the word, as "carbunchons," namely polished globules, are never made of diamonds; a rose is what was meant and one of Tavernier's editors made a mistake.

You will see it to-morrow alone at your leisure. When a quarter of the day is passed,' 'tis thus they speak, 'you will find me outside the town, and if you want the stone you will bring me the money.' And he told me the sum he wanted for it. I did not fail to go to him and bring him the required sum, with the exception of two hundred pagods which I put aside, but which after a dispute I had to give him also. At my return to Surat I sold the stone to a Dutch captain out of whom I had an honest profit."

This last remark suggests the reason why Tavernier, usually so ready to give figures, did not mention the sum demanded by the dirty Banian for his diamond. Possibly the long-headed peddler feared that had he stated the amounts his readers might not have deemed his profit quite so honest. Can this be the reason, moreover, of his total silence regarding the purchase of the Blue Diamond? It seems the fate of this marvelous stone to come from out of the Unknown in a mysterious fashion. We shall meet it, appearing suddenly and without a history.

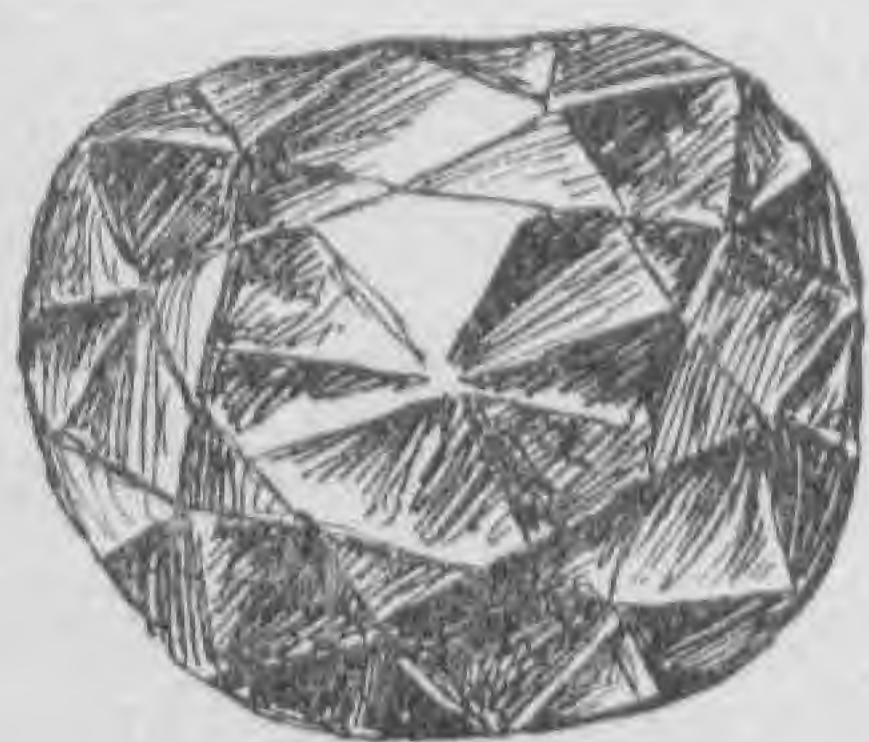
Tavernier gives three drawings of this Blue Diamond, which was, he said, clear and of a lovely violet hue, and its weight in the rough was one hundred and twelve and one quarter carats. There is no other example of a blue diamond of this deep tint known — a fact which went far to establish the identity of the Blue Diamond in



TAVERNIER'S BLUE DIAMOND.

aftertimes. Diamonds of all the colors which belong of right to other precious stones are occasionally found. Thus they are red, green, yellow, and blue. The first and last named tints being the rarest, while the yellow is decidedly common. The true diamond, however, no matter what may be its hue, has an iridescent brightness which no other gem can counterfeit. This iridescence, coupled with its hardness, forms the test of the diamond; and its absence never fails to reveal the nature of an impostor. If anything can scratch a stone, that stone is not a diamond. The

writer, in common with all her schoolmates, once bestowed a great deal of admiration and no small portion of envy upon a young companion on the strength of that young companion's diamond, a lustrous gem of most remarkable size that quite seemed to overwhelm the small



THE "HOPE BLUE"
DIAMOND.

finger which carried it. Alas! our admiration was undeserved and our envy misplaced. That splendid diamond had upon its upper surface three deep scratches!

But to return. When Louis XIV. bought from Tavernier at, we will say, an "honest profit" to the seller, that three millions' worth of precious stuffs and stones, he became possessed of the Blue Diamond. This was in 1668 when the king was in the full tide of his glory, and also of his extravagance, conquering provinces, building palaces and buying gems.

There seems to be no record of the first cutting of the Blue Diamond, if indeed it was cut at all during the reign of the "Grand Monarque." And what is still more strange, it seems to have attracted very little attention, its heaven-blue tint being perhaps somewhat dimmed by the more striking splendor of the Regent which ere long was to attract all eyes and absorb all attention.

In 1776, fourteen hundred and seventy-one diamonds belonging to the French crown were sold, and the money thus obtained was used in recutting the remainder besides adding sundry other jewels to the Regalia. In February, 1788, the Antwerp Gazette makes known to the world that there had just been completed in that city a work of great magnitude. This was the re-cutting into brilliants of all the rose-diamonds belonging to the King of France. The reader will remember that "roses" are diamonds covered over with facets, such as the Orloff, while the brilliant properly so-called is a double pyramid, a highly refracting figure, of which the Regent and the Koh-i-nûr are examples.

Diamond cutting was a lost art in France; hence the reason of sending the gems to Antwerp. Cardinal Mazarin, a great diamond fancier, had endeavored to stimulate diamond-

cutting in Paris. He had imported workmen and wheels and then had caused his own stones and those of the king to be cut. When this was done, and further diamonds not being forthcoming, in order to still encourage his pet industry he had the same stones cut a second time! Such expensive encouragement of the diamond-cutting trade has probably never been heard of before or since.

The Antwerp artists having accomplished their task to the satisfaction of Louis XVI., "he rewarded with presents, magnificent and really worthy of a King of France, all those who had a hand in it." The Blue Diamond came forth from the hands of the cutter an irregularly-shaped brilliant of a drop form weighing sixty-seven and one half carats.

In 1791, it was entered in the inventory of the Crown Jewels, which was drawn up by order of the Constituent Assembly, at the high valuation of six hundred thousand dollars. It will be thus seen that it had enormously increased in value since its "rough" days, for then the Blue Diamond as well as all the other diamonds and precious stuffs were bought from Tavernier for that precise amount.

In the story of "the Regent" an account was given of the robbery of the Garde Meuble in September, 1792, when the French jewels were stolen. The Blue Diamond shared the fate of all the rest. It was stolen, but unfortunately it was not found in that mysterious Allée des Veuves where the Regent lay hidden. In fact, Tavernier's Blue Diamond, weighing sixty-seven carats, never again reappeared as such. Men had something else to think of in France besides diamonds during the forty years which followed the great robbery, so that the very existence of a blue diamond was pretty nearly forgotten. True that John Mane, a fairly reliable authority on diamonds, says that "There is at this time (1813) a superlatively fine blue diamond of above forty-four carats in the possession of an individual in London which may be considered as matchless and of course of arbitrary value." This is a most important statement, and in the light of subsequent investigations it would point almost conclusively to the



"BRUNSWICK"
BLUE DIAMOND.

fact that the French Blue, already metamorphosed, was in alien hands, except for the fact that the same writer a little further on makes the announcement of a Blue Diamond, weight sixty-seven carats, being amongst the Crown Jewels of France at the same moment.

However this may be, suddenly, in 1830, the small world of diamond-worshippers was startled by the appearance in the market of a unique stone. A deep blue diamond, forty-four and one fourth carats, which Mr. Daniel Eliason had for sale and about which he could give no details. It sprang suddenly upon the world without a history, unless indeed it be the same as that mentioned by Mane some eighteen years before—and yet it was a cut and polished brilliant. Its form was irregular, for it had one very flat side. Mr. Henry Philip Hope bought it for ninety thousand dollars; and it henceforward became known as the "Hope Blue."

As a notable gem in a famous private collection the Hope Blue enjoyed for years a quiet distinction. It was set round about with pearls and white diamonds to enhance its azure and had a beautiful pearl-drop for pendant. Altogether it was a neat and delightful trinket; price one hundred and fifty thousand dollars. Little or nothing was thought about it until the death of the Duke of Brunswick, the mad diamond-miser who used to sleep surrounded with mechanical pistols which were warranted to go off with such fatal facility that it is a marvel they did not shoot his Grace in mistake for a burglar. In 1874, the Brunswick diamonds came to the hammer and amongst them a blue stone of six carats weight. Mr. Streeter, than whom there exists no better authority on diamonds, had this stone and the Hope Blue put into his hands together. He found that they were identical in color and quality, that the sides of cleavage matched as nearly as could be determined after the cutting, while the united weights plus the calculated less from re-cutting amounted to the weight of the French Blue. He immediately drew the very natural conclusion that both these stones were once united and formed the Blue Diamond brought from India by Tavernier. He, it will be remembered, called it of a "lovely violet" and as only very few other blue diamonds are known to be in existence, and they are all

of a pale blue tint, we must admit that the weight of evidence hangs strongly in favor of Mr. Streeter's reasoning.

The collection of the late Mr. Hope was a very large and valuable one. Of course the blue diamond was its chief glory, but it contained other gems of value. A portion of these were recently offered for sale consisting of diamonds, sapphires, opals and pearls, set and unset, and of rings, crosses and bracelets of all sorts of shapes and patterns. The display reminded one of a jeweller's show-case except for this remarkable difference. There were no two



"HOPE BLUE" DIAMOND, AS MOUNTED.

objects alike, and all showed the refined taste of an amateur rather than the massive showiness of the mere commercial jewel.

Mr. Hope engaged an eminent jeweller, Mr. Hertz, at an eminent fee (five thousand dollars) to catalogue his jewels. This gentleman performed his task with business-like succinctness, using no unnecessary words to describe the numerous precious objects. But when he reached the Blue Diamond he launches out into unbridled enthusiasm. He says:

"This matchless gem combines the beautiful color of the sapphire with the prismatic fire and brilliancy of the diamond, and on account of its extraordinary color, great size and other fine qualities it certainly may be called unique, as we may presume there exists no cabinet nor

any collection of crown jewels in the world which can boast of the possession of so curious and fine a gem as the one we are now describing, and we expect to be borne out in our opinion by our readers. There are extant historical records and treatises on the precious gems which give us descriptions of all the extraordinary diamonds in the possession of all the crowned heads of Europe as well as of the princes of the Eastern countries. But in vain do we search for any record of a gem which can in point of curiosity, beauty and perfection be compared with this blue brilliant, etc."

Mr. Hertz was no doubt a good jeweller and a clever expert, but he was not very learned in the history of precious stones or he could never have made this astonishing statement. He had only to search in the records of France to find the account of a wonderful blue diamond of even greater size.

With regard to the value of the diamond, he declares his inability to fix any sum, saying: "There being no precedent the value cannot be established by comparison. The price which was once asked for this diamond was thirty thousand pounds (one hundred and fifty thousand dollars) but we must confess for the above stated reason that it might have been estimated at even a higher sum." There was a precedent for estimating its value; but of that Mr. Hertz

was ignorant. The French Blue was valued at three millions of livres (six hundred thousand dollars) when it weighed sixty-seven carats. According to this calculation one hundred and fifty thousand dollars was not an excessive price to put upon the Hope Blue of forty-four carats.

The Hope Blue still remains in the possession of the family which has given it that name, while the other fraction of the dis severed French Blue is likewise in private hands. This is much to be regretted from the historian's point of view, for famous diamonds acquire a great deal of their value and all their interest from the persons who have owned them. For a gem which has graced the royal festivities of Versailles as the Blue Diamond has done, or enhanced the stately ceremonials of the Escorial as was the case with the Pelegrina, to sink into obscurity in the collection of a wealthy Mr. Unknown or in the jewel casket of a Princess Nobody is a sad decadence. Jewels, from their value and indestructibility, are among the few objects used by the illustrious dead which can and do remain unaltered in appearance, therefore it is contrary to our sense of the fitness of things for a historical gem to cease to be such by belonging to a person without a history.

Mrs. Goddard Orpen.

HINTS FOR HOME ENTERTAINMENTS.

(Ways To Do Things.)

IT is a universal custom among boys and girls to have social gatherings at their homes; and one of the first questions presenting itself to a young host or hostess is, "How can the occasion be made a success? Shall we have dancing, cards, or what?"

Speaking from the average guest's standpoint the answer would probably be as follows:

The realization of a dancing or card party seldom, if ever, equals the anticipation, and although both are popular means of diversion, they generally fail to make such an impression that the occasion is recalled with any especial gratification — probably because the participants

are not all good dancers, while a less number can be classed as even fair "hands at cards"; in both cases these prove an annoyance to more skillful partners.

The writer has frequently been called upon to assist in both private and public amateur entertainments, and has invariably noticed that whatever causes a quickening of the mental faculties, or is instructive, is better calculated to give thorough enjoyment than that which appeals merely to the senses. A few suggestions in accordance are here offered.

Having arranged the company in a circle cosily seated, place in the center some one as

leader, who asks the "class," thus formed, to "number off." Each one is informed that the number first selected is to be retained by him throughout the game.

Leader says: "The Prince of Paris lost his hat, now who's to blame but Number Nine, sir?"

Number Nine asks: "Me, sir?"

Leader answers: "You, sir!"

Number Nine says: "Not I, sir!"

Leader asks: "Who, then, sir?"

Number Nine answers: "Number Three, sir!"

Number Three asks: "Me, sir?"

Leader answers: "You, sir!"

Number Three says: "Not I, sir!"

And the formula is continued as above; a failure to respond at once or correctly, is sufficient cause for the leader to demand that the delinquent go to the foot, while the succeeding Numbers move up, and thus occupy all the seats once more. As the objective point for each one is the Head of the class, those who retain high positions soon become targets for the shots of their less fortunate competitors.

After the company have become somewhat familiar with the questions and answers, the leader may, at option, change the wording of his question, thus making it more difficult to render the correct answers, which must be given in their proper order as stated, no matter what the questions asked by the leader may be. The interest can be greatly increased by providing a suitable prize for the successful head scholar.

Simple as is this play, yet in most cases it will be found to have accomplished its purpose—the ice will be broken; and an opportunity offered for the introduction of something not quite so boisterous in its nature.

Or as a substitute; by having previously arranged the accessories, considerable amusement will result from the following:

Procure a board, five feet long by one foot in width, with a smooth surface; half a foot from one end cut out a circle of six inches diameter; mark the board, either by different colored paints or otherwise, so that it may show three divisions; fasten under the end from which the circle has been cut a piece of wood about a foot long that may serve to elevate that end when the board is placed upon the floor.

Prepare half a dozen small bags about four inches square, and fill them with beans. Then having placed your board in a convenient place on the floor, invite the company to show their skill in tossing the bean bags through the hole from some fixed point. For every bag that falls through the bull's-eye score fifty; for those remaining on the different divisions of the board, score twenty, ten or five, according as it is the nearest or farthest from the circle. Two or three prizes should be provided for the competitors making the highest and lowest scores.

Or, being provided with six more similar bean bags, divide the company into two sides, and place them facing each other. The leader of each places his six bags on a chair at his side; at a given signal, each leader picks up one bag with his right hand, passes it with his left to his neighbor, who receives with his right, and passes it on with his left; and so on to the end of the line. As the leaders pass one bag they start another, until all are under way; as the bags arrive at the end of the line they are placed upon chairs, until all have arrived, when they are returned over the same road. The side first returning to its leader all the bags that were started, is declared victorious.

Either of the above will accomplish the purpose for which it was intended—to produce a state of gayety and "feeling at ease"; then, in order to sharpen the wits, "verbarian" is an excellent auxiliary:

Choose a key-word (for instance, "Constantinople"), and having distributed sheets of paper to the company, request them to write the word at the top of their slips; when all are ready, give the signal, and let each one see how many words he can form within a certain limited time—say three minutes—each word to begin with "C" and the letters used being only those contained in the key-word. When the time has expired, ask one to read off the words he has formed (cannon, cotton, canoeist, client, etc.), while both he and those having the same words on their slips, so mark them by a check that they may know they have been duplicated. Request the next in turn to read off any words remaining unchecked on his slip, all checking as before. When the readings are finished, each one can thus find the value of his slip:

For all words not duplicated by others, count ten points each. For all duplicated words count one point each. For any not found in a standard dictionary or misspelled, deduct five points each from the score.

Next using "O" as the initial letter in place of "C" proceed as before; then take each succeeding letter in turn as the initial, until all have been exhausted. The person obtaining the highest score is declared victor.

A good substitute for the above may be found in "Familiar Quotations." Having distributed slips of paper as before stated, request one of the company to furnish a quotation for the others to guess; he will find it more convenient if written out as in the following example:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
A little rain lays much dust

Then having told the others that the quotation contains twenty-three letters, and that (say) ten errors will be allowed, let them write out a corresponding number of figures.

All now being ready to hunt for the quotation, request some one to ask for a letter. If A is called for the answer may be either one, nine, or thirteen; whichever number is mentioned all write that letter under their corresponding number, the leader crossing his out to avoid repetition. The next in order then asks for a letter, either the same as already obtained, or a different one, all filling in their blanks at the proper places, with the letters successively called for. When a letter is asked for which the leader has already exhausted, or is unable to furnish from his quotation, an error is declared against the questioner; the next in order then calls for some other letter.

If after the limit of errors has been reached the company are still unable to decipher the quotation, the leader may demand a forfeit from the person who has made the greatest number of errors. On the other hand however, if any one is able (at any time during the game) to give the quotation, he may demand that the leader pay a suitable forfeit, and he also has the privilege of furnishing a new quotation for the others to decipher.

If the suggestions already given do not quite strike your fancy, possibly a more vigorous men-

tal exercise would prove beneficial. Such being the case, suppose you experiment with this:

The company, being supplied with paper, are requested to write down (within a limited time) as many geographical names beginning with a certain letter, as they can call to mind. Countries, towns, rivers, lakes or anything that may be found upon a map, should be accepted. When the lists are compared, count as follows: All names not duplicated, and which can be located by the writer if called upon to do so, are valued at five points each. A loss of three points for each one that cannot be so located should be deducted from the score.

This feat is not quite so easy to execute as it at first appears. Names having the chosen initial are recalled with difficulty, and the limited time has passed before one has written even a respectable number.

"Buzz" is something that will prove a tax to the mental powers. All being seated, proceed as follows: instruct the first in order to say "one," the next "two," and so on up to "seven"—for this number the word "buzz" must be substituted—then the next is "eight," but fourteen, twenty-one and all multiples of "seven" are "buzz," also all numbers containing the word "seven," such as "seventeen," "twenty-seven," etc. "Seventy" is "buzz," "seventy-one" "buzz-one," seventy-seven "buzz-buzz," and so on.

Any one failing to "buzz" at the proper number must retire from the competition; the others may then begin at "one," or continue at the number failed upon. Proceed in this manner until all have failed but one.

A very amusing diversion, and one that will bring into action the individual talent of a company, may be found in "initials." Form two sides, as nearly equal in numbers and mental powers as possible. One side remains in the room as an audience, while the other retires to decide upon some subject that they may easily represent by acting

Suppose, for instance, that a "Traveling Theatrical Troop" is the chosen subject. Inform the audience that the initials are T. T. T. The actors then appear and enact a scene in pantomime with which they may be familiar (say comedy).

If the audience are unable to guess the subject from the clew furnished, they may request another scene. The actors then have an opportunity of showing their ability to puzzle the audience by representing a scene entirely different in character from the first one (say tragedy) while the identity of the subject is not destroyed.

It will be found best to limit the number of representations of any one subject, and thus

give those who have formed the audience an opportunity of exchanging with the actors; they are also entitled to make this change whenever they shall guess the subject that has been acted.

With the articles at hand in almost every household, it will not be found difficult to render effective representations of the chosen subjects, and an advantage is also gained, in not requiring previous preparation of accessories.

Hilary Thornton.

"THE OLD EARTH TREMBLES."

(Geological Talks.)

NEARLY three years ago, August 31, 1886, the people of the United States were much surprised over a great earthquake which left a large portion of the city of Charleston, South Carolina, in ruins and destroyed many thousands of dollars worth of property and some lives. A study of this great earthquake teaches us some interesting lessons.

Let us gather some of the phenomena and facts of this earthquake from the newspapers of the time. For several days, from September 1 to September 9, they were filled with accounts of the shocks experienced during that time. Of these shocks the first was the most severe. Two or three others were nearly as great, but the larger number were not of much power.

Let us notice first the area affected. It was unusually great. The shock is reported from every State east of the Mississippi with the exception of some New England States. West of the Mississippi it was felt in Iowa and Missouri.

Next notice the time reports. The shock was felt at Charleston at 9.53 P. M., August 31. It was only about 10, when it was felt at Albany, N. Y., and St. Louis, Mo.

As to certain details of the shock, the reports say that "buildings swayed from side to side"; "the earth rose and fell like a wave of the ocean"; "a sound was heard like that caused by the rolling of a heavy body — it deepened in volume and spread into an awful roar; the tremor

was now a rude rapid quiver that agitated the whole building; a continuous jar only adding force every minute"; great ruin was caused; "in the residence portion of the city many houses suffered seriously, and streets, yards and gardens were filled with fallen chimneys and fragments of walls, while the walls that were left standing were rent asunder in many cases from top to bottom and badly shattered"; "scarcely a hundred houses in the city are occupied at this time — people generally remain in the streets in tents and improvised shelters, and will camp out to-night fearing another shock — the gas works are injured and probably the city will be without light to-night."

Among curious matters connected with the earthquake were fissures, sink holes and "geysers" and the way in which monuments in the cemetery were twisted — thus: "a sink near the German Church on Tuesday perfectly dry sand is now full of water"; "a cabin is completely surrounded by yawning chasms, extending to a depth of ten feet, and all around are sinks of fresh water"; the fissures generally extend in various directions and go downward in the ground slantingly; geysers, so called, were jets of water mixed with sand thrown up through fissures. This sand was variously colored. Near Summerfield there were the greatest number of these queer outbreaks. "In one field nine were counted, the sand cone in some cases covering

a circular area twenty feet in diameter; there are usually three or four orifices in these into which a cane may be thrust three or four feet, and around these the sand is heaped up in



mounds and lies baked and hard under the sun; the sand is of three colors—yellow, blue and drab and comes from five to ten, ten to fifteen, and thirty feet respectively. The volume of water in these geysers is very large and sometimes was thrown to a height of fifteen feet."

In the cemetery many monuments were found whirled or twisted around on their bases, which led people to think that there was a whirling movement in this earthquake, as there really is in some. It is not likely however that there was such a motion here. The monuments whirled about as often in one direction as another, which of course would not happen with such a movement. All would be whirled the same way. So it is probable that they were simply shaken back and forth, thus producing the whirling. The axis of movement seems to have been north and south—a little west of north. The point of origin seems to have been below Summerville, a few miles from Charleston proper.

So much for the Charleston earthquake. It was a general surprise. Few people realize how many shocks of earthquake occur in the United States. In 1885 in our country and Canada there

were fifty-nine shocks. In twelve years, 1872–1883, there were three hundred and sixty-four—one hundred and forty-seven on the Atlantic slope, sixty-six in the Mississippi Valley, one hundred and fifty-one on the Pacific slope. An earthquake every two weeks! But most of these were feeble. Only when a powerful shock strikes a great city do we hear much of it.

Let us now take a broader survey of earthquakes. What is an earthquake? Here we must gain an idea of waves and wave motion. Imagine a great spherical ball of stone, with a small spherical cavity at its very center. Imagine moreover an explosion of powder in this cavity. The force of the explosion touches every particle of the wall of the cavity and throws it into motion. These swing against the particles next outside, and causes them to vibrate. Thus the force of the explosion is transmitted outward from one layer of particles to another until the surface is reached and it is made to quiver and vibrate. Every particle of the surface will be set to swinging at one time if the ball is spherical and the central cavity be spherical also. Suppose the cavity not central, the force will reach the point of the surface nearest the cavity first and the surface motion will proceed from there in an ever-widening circular area. Suppose the cavity not spherical the surface movement will not be in widening circles. Suppose the ball is not of the same material throughout, the shape of the surface movement and the time taken for the force to move outward will both be affected.

Now we call such a movement of a force through a body a "wave." If it moves in all directions through a solid, from within outward, it is a spherical wave. In an earthquake we have a great spherical wave or series of waves one within another passing outward from some point or line or cavity, within the earth's crust, outward. A force (perhaps an explosion, a jar, or a grating) applied at that place is transmitted outward in more or less spherical waves. When these reach the surface they show themselves as ever-widening, more-or-less circular movements, which are like water-waves and which give the curious motions of the earthquake. If the earth's crust was of one material and the place struck by the force at the beginning was a single point,

these land-surface waves would be really circular; as these conditions never occur in any earthquake the waves are more or less lengthened and irregular.

The point or place where the earthquake force begins is called the "focus." The point directly above the focus, where the earth-wave first appears at the surface, is called "the epicentrum." From here along the surface we have the ever-widening wave. A line joining any place affected by the wave to the focus, shows the motion felt at that place. It is just as if a force acted upon it along that line. (See Fig. 2.)

Facts concerning earthquakes may be gathered either by means of instruments, or by direct observation of results of shocks. An instrument for earthquake observations should show the direction in which the wave travels, the force of the shock, and the time of it. A very simple apparatus may give some of these facts. Thus, a cup of molasses will show by the side to which the molasses is shaken and the height to which it reaches, on the side of the cup, the direction of movement and the force. Of course this is very rough work. For careful observation, to show the exact time, direction, and power, very elaborate and expensive instruments are made. Such are in use mainly in Italy and Japan. There is in every wave a force that tends to throw objects upward and one that tends to shake them horizontally back and forth. The first is called the "vertical element;" the other "the horizontal element." The best instruments measure each of these. With such instruments we can learn much about the earthquake, its epicentrum, its focus, and its movements.

When no such instruments are at hand much may be learned by carefully examining the area shaken after the earth-shock is over. Robert Mallet of England, who did perhaps more study on earthquakes than any man before or since, made a careful study of the Calabrian earthquake of 1783. It has been rendered famous by his researches. By a study of fissures, fallen columns, cracks in buildings and the amount of damage at different points and by a use of time records he discovered the rate of movement, the direction of wave, the location, size and shape of the cavity where the earthquake originated and calculated the amount of force neces-

sary to produce the results observed. To show you the general plan pursued I take two cases:

Suppose we have a great number of time-records showing when the earth wave reached several places; we wish to find the "epicentrum." On a map draw lines through places reached by the wave at one time. Thus we know when a wave reaches places *a b c d e f g*. It reached *a* at 9 o'clock, *b c d* at 9.02, *e f g* at 9.04. The lines show the shape of the wave on the surface.

Now if we have three points reached at one time, connect them with one another by straight lines: thus *b-c-d*. Connect *b-c* and *c-d*. Divide the straight lines at their central points and draw lines perpendicular at these points. Where these perpendicular lines cut each other will be the "epicentrum" — here *x*.

Again, in any building much cracked, the majority of cracks run at right angles to the line connecting the building with the focus. Thus in Fig. 2, *a* is a building the principal direction of cracks in which is represented by dotted lines. A line at right angles to these will pass through the focus. Take another building at some dis-

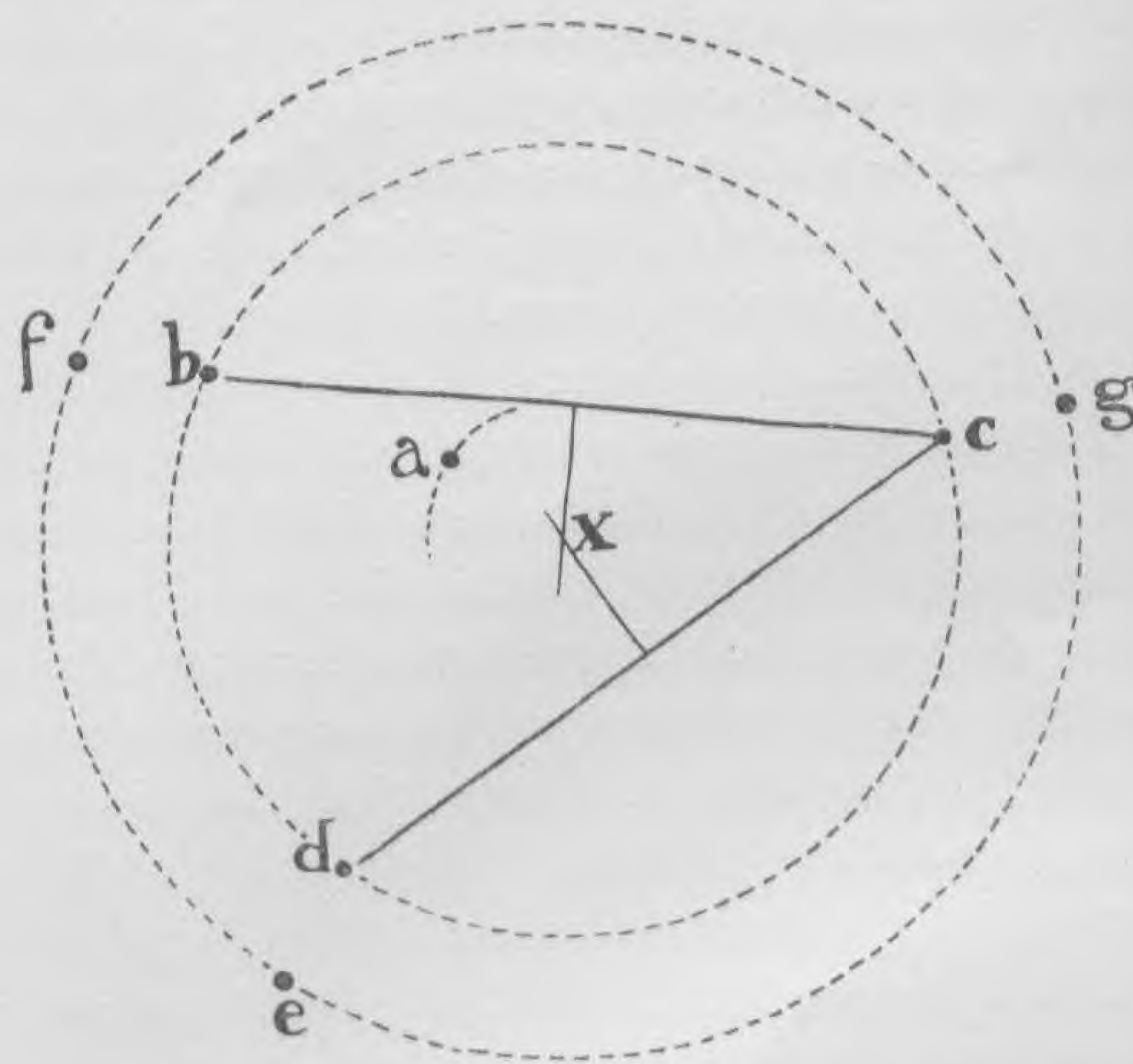


FIG. 1.

tance, *b*, find the line at right angles to its main cracking. Where the two lines cut is the focus, *x*. These are both simple ways of finding facts from observations. They are fairly correct.

Lastly in regard to earthquakes — what are their causes? There are several. Sometimes

the shocks are connected with volcanic eruptions and the same escaping steam that causes the outburst seems to have set the rocks to jarring. In other cases, we may have great beds of rock extending for miles, traversed by a huge crack or "fault." The rock on one side of this may slip, and an earth jar result. In Japan where earthquakes are of almost daily occurrence it seems

down by them for tying their boats to, are now out in the sea.

The most remarkable example of sinking to be seen at present, perhaps, is presented in the island-district of the South Pacific. Many or most of these islands are of coral formation. They consist of a ring of coral-reef rock inclosing usually a little area of sea-water called a lagoon. The reef of coral rock projects only a few feet above the surface of the sea, but it is frequently more than two thousand feet thick, from its base to the surface. Below the water's level for one hundred feet we find living coral animals on this reef wall; below that all is dead coral rock. Let us now see how such an island is formed. Coral reefs grow only in fairly shallow depths—not more than one hundred feet. So when

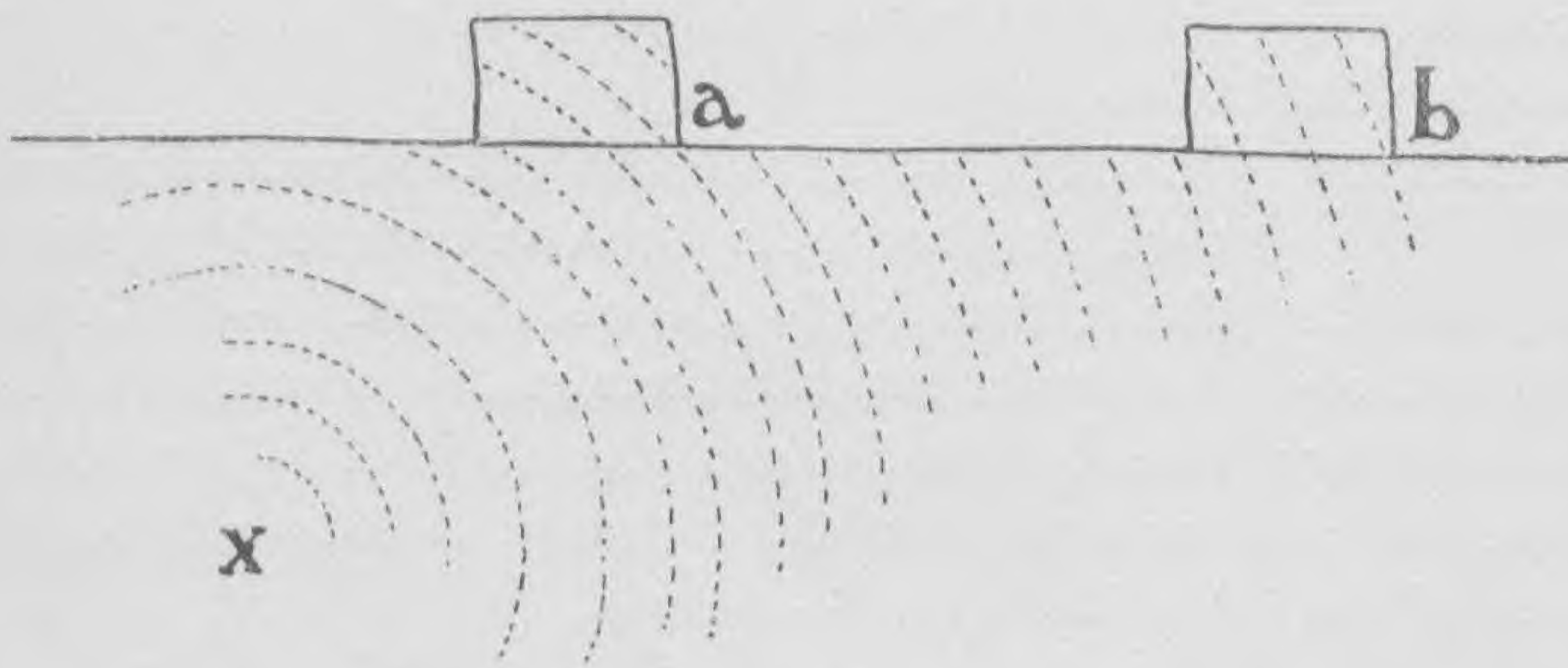


FIG. 2.

likely that they are often produced by explosions of steam in fissures. In some districts volcanoes may throw out such vast quantities of lava as to leave a hollow, the roof of which by settling gives rise to earthquakes. Such are not common. There are other causes also. Our Charleston earthquake was thought by one geologist to be a land slide—a slipping seaward of a great mass. Another prominent geologist believed it to be the settling of rock areas, long ago fissured, along the line of fracture.

These earthquakes are not the most important earth movements. They are limited in extent, and though at times destructive, are not of prime importance. There are other tremblings and movements of the earth of far greater magnitude, but so slow and quiet that they do not attract much attention. Thus the coast of New Jersey is at present sinking. This is plainly shown by many facts. At Long Branch stumps of trees rooted in their original positions are below the water. They must have grown on dry land. In some parts of the State, fields surveyed and mapped in early time are now under the sea. In Greenland the coast is known to have been sinking for four centuries past at least. Buildings have been submerged. There are settlements there made long ago by Moravian missionaries. The posts, originally put

this great bank began the sea bottom must have been no more than one hundred feet down. The reef probably began around the edge of an island of volcanic origin. The corals grew from the edge of the island over all the bottom out to about one hundred feet of depth of water. Such a reef is called a fringing reef. This island with its fringing belt of coral reef may remain as it is. But, if so, it never comes to be a coral island. If, however, the island slowly sinks, the corals continuing to build upon the reef as it sinks, we may have an island peak with a "barrier reef"—or a reef out from the shore with a ring of water between the island and the reef. Still the sinking continues, the original island disappears, and we have the belt of coral reef with a lagoon in the center and our coral island is made. Such a coral island is an evidence of a sinking area. We may find all steps of the process in the Pacific, from a volcanic island with its fringing reef, through the island with a barrier reef to the completed atoll inclosing its lagoon.

By such lagoon-filled atolls we are shown that an immense area has been sinking here—at least twenty million square miles. Very slow this sinking must have been, as coral grows slowly, and the subsidence must not be more rapid than the coral can grow or all would dis-

appear. The amount of this sinking must have been in many cases three thousand feet or more. The sinking has perhaps ceased as some of the islands show evidence of a recent upward movement.

Not only are some regions sinking; others are rising. Sweden and Finland are coming up out of the sea. Certain districts in the western part of our own country have for many ages been rising. In fact, it is likely that as much of the earth is rising to-day as is sinking. We are sure that a certain range of mountains standing squarely across the course of one of our western rivers must have been elevated with great

To do the latter of course the mountain's rising could be no faster than the river's cutting. We know the last must have been slow, so the former must have been also.

Now we see why the "tooth of time" will never gnaw the continents down flat to almost sea-level. The earth is not quiet. It constantly moves. Mighty earthquakes raise or sink whole coast lines. Slow movements carried on for ages raise hundreds of ridges up to vast heights and plunge vast areas below the sea. Old mountains wear away and their streams grow weak. New ones are raised up and give birth to new rivers. We speak of solid land and fixed hills—but

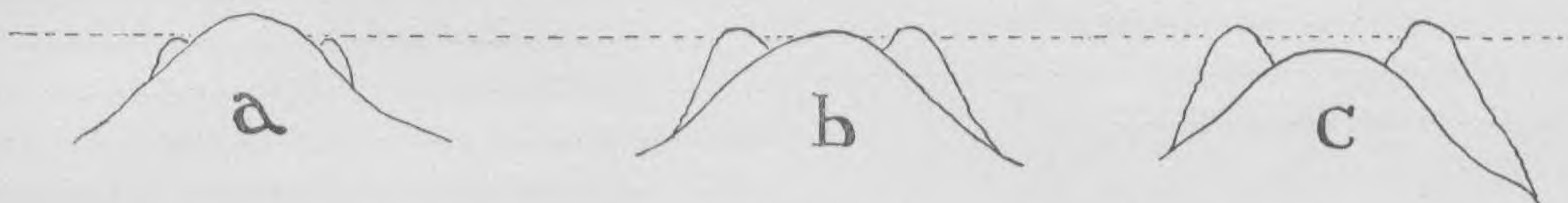


FIG. 3.

(Sections showing growth of coral island: (a) island with fringing reef; (b) island with barrier reef; (c) atoll with lagoon.)

slowness. The river and its channel were there before the range. As the mountain range rose across its way, the river must either change its course or cut its channel through the mountain.

there are none; the whole earth trembles—now and again with the mighty crash of the earthquake, but constantly by the slow and quiet movements of elevation and depression.

Frederick Starr.

CALIPHATE OF BAGDAD.

(Search-Questions in Mahometan History.)

81. What was the emblem of the Abassides?
82. What effect had the rise of the Abasside dynasty upon the unity of the Caliphate?
83. By which of the Abasside Caliphs was Bagdad made the Moslem capital?
84. By what other name was the city called?
85. What was the religion of Persia before Mahometanism prevailed?
86. What rationalistic faith founded partly on Persian philosophy was for fifty years the dominant creed among the Moslems of Bagdad?
87. What great schism which originated in the latter years of the Omeyyad dynasty and

spread widely under the Abassides still divides the Moslem world?

88. To which of these schismatic parties have the Persians always belonged?

89. To whom does the poet Moore thus allude in *Lalla Rookh*?

"Over his features hung
The veil, the silver veil, which he had flung
In mercy there to hide from mortal sight
His dazzling brow."

90. What caliph reigned from 786 to 809?

91. What celebrated Christian monarch was his contemporary?

92. What was the policy of this Caliph towards literature and the arts?

93. To whom does Longfellow here allude?

“Remember Barmecide
And tremble to be happy with the rest.”

94. What event happened to Bagdad in 813 and who was Caliph at the time?

95. What Caliph placed a Christian at the head of a college at Damascus?

96. Who were the Fatimites?

97. When was the Turkish dynasty of the Seljuks founded at Bagdad?

98. What Egyptian dynasty was overthrown by Saladin in 1171?

99. Who was the last Caliph of Bagdad?

100. What event terminated the Caliphate of Bagdad and when did it occur?

ANSWERS TO FEBRUARY SEARCH-QUESTIONS.

41. From the Hegira.

42. Eleven days.

43. Moharram, Safar, Rabî I., Rabî II., Jumâd I., Jumâd II., Rajab, Shâbân, Ramadhân or Ramzân, Shawâl, Dzul Câda, Dzul Hiji.

44. Five times: at dawn, midday, in the afternoon, at sunset and at night.

45. Lustration.

46. Friday.

47. Toward the Temple at Mecca.

48. The Adzân, which is as follows: “Great is the Lord! Great is the Lord! I bear witness that there is no God but the Lord: I bear witness that Mahomet is the Prophet of God. Come unto Prayer: come unto Salvation. God is Great! God is Great! There is no God but the Lord! Prayer is better than Sleep! Prayer is better than Sleep!”

49. Ramadhân.

50. From sunrise to sunset the obligation to abstain entirely from eating and drinking con-

tinues; but from sunset to sunrise eating and drinking may be indulged in.

51. It originally corresponded with the month of December, but now is a summer month.

52. The Korân consists entirely of revelations which Mahomet declared were received by him, from time to time, from God by means of the angel Gabriel.

53. At the moment of professed inspiration the words that Mahomet uttered were committed to writing by his followers, but during his lifetime these fragments were not systematically arranged. The Korân was also committed to memory by many of the early Moslems but probably not in any fixed order.

54. Soon after the death of Mahomet the Korân was collected by Zeid, an amanuensis of Medina, and for ten years this was the standard text. Copies made from this soon began to vary and by order of the Caliph Othman a new collation was made and all former copies destroyed. Multitudes of transcripts of this were distributed through the Moslem empire and no variations of importance have since occurred.

55. Both are forbidden.

56. “Praise be to God, the Lord of creation, the All-merciful, the All-compassionate! Ruler of the day of Reckoning! Thee we worship, and Thee we invoke for help, Lead us in the straight path; — The path of those upon whom thou hast been gracious, not of those that are the objects of wrath, or that are in error.”

57. The unity of God.

58. Judaism.

59. The former sought a spiritual not a temporal power: Mahomet’s aim was to spread his doctrines by force.

60. It substituted in place of idolatry a belief in one God and in consequence of this it aroused the entire population of Arabia from spiritual indolence to a realizing sense of Almighty power and goodness.

Oscar Fay Adams.





MEATS AND MADE-OVERS.

(Cooking in the Public Schools.)



"CHOPPING IT FINE."

D ID you ever notice what a little thing it takes, sometimes, to set the whole current of a life in a certain direction? Sometimes it is so slight that we cannot see it, and then we talk about "happenings," just as though anything in the world ever merely happened. All this comes of a visit one of the mothers of a girl, graduated the year before, made to the teacher of the cooking school. She said, "I could not help coming to tell you what the cooking class means for my daughter."

She was a colored woman who had been a cook in a Southern family, but had married and come to Boston, where she had brought up a family of children, giving them the benefit of a public school training. All this she told the teacher. Then she said:

"My daughter was very much interested in the cooking, and I used to let her try her lessons over at home. I was delighted with what she did, because not only was the food that she cooked good, but she did it in such a nice handy way. Last Sunday I let her cook all the dinner, and I'll tell you what she had. Roast goose and apple sauce, mashed potatoes, squash, turnips, and apple pie. Every thing was so good. We had company, and they didn't stop praising Ada all day. I tell you I was prouder

than she was, and she was proud enough. She just loves it, and now I'll tell you what I'm going to do. I'm going to send her through the Normal School, then I want her to go through the Normal Cooking School, then go South and teach her people. She's just wild to do it, and now we're going straight ahead because we know just what we're working for, thanks to you, and the ladies who started the school."

It is a good thing to have one's vocation fixed, so as to know just what one is working for, isn't it? I think Mrs. Hemenway will be glad she was moved to start this movement, even for this one girl's sake, whose future lies before her a straight path clearly cut.

In the subject of this chapter we have a full day's work; work for two classes, and this is the way it is managed in the school. The lesson for "meats" comes in the morning, the lesson on "made-overs" in the afternoon. This is because the meat being cooked in the first lesson it is ready for use in the second, so the same material really does service for both lessons and a saving is made in this way. For you must see that unless a great deal of care is exercised, the expenses of providing material for so many to work with, might easily be increased so that the outlay would exceed the appropriation. This would never do; for one of the first things to be learned is how to make the sum in hand cover all the expense of buying. Of course this is a matter that must rest with the teacher; but in preparing the course of instruction Miss Homans was very particular in having every thing tested, and every expense brought down to the lowest figure. In this she was admirably seconded by Miss Hope the teacher of the Tennyson Street School, and it is that system,

tested and well proven, that is the basis of all the teaching in the schools of Boston and vicinity; and, indeed, of all the schools which have sprung from the Boston experiment. I shall have something to say about the expenses of a year's work later, as well as something about the Normal Training, and the kind of teachers that are required to make this work a success.

But to come back to our lessons: as one class comes only half a day at a time, it becomes quite evident that the class which learns about meat in the morning isn't the one that has to take the instruction about made-over dishes in the afternoon and *vice versa*. But every girl must have all the lessons, so these two are repeated for the next day and the classes are changed about. The one that learned about meats comes in the afternoon, and takes the lesson in made-overs, and the class that was the afternoon class before is the morning class this time. So you see all get the instruction, and the cost of the four lessons is put into the cost of two; a little household management, such as you all will have to put into practise one day or other, and it is just as well to take your lesson early.

There are many ways of cooking meat, roasting, boiling, braising, broiling, and frying or sautéing. The ways of cooking depends upon the pieces of meat that are to be cooked. If the fibers are tough it should be boiled or braised. It is the tender meat only which can be either roasted or broiled to be palatable, comfortably eaten and well-digested.

One of the simplest ways of preparing meat is to boil it. The piece to be boiled should be well wiped, then put at once into boiling water that has been salted. The water should cover the meat, and it should boil for a few minutes, when it may be set back on the fire, and simmer gently until the meat is done. If the water is boiling when the meat is put in, the intense heat sears the surface and prevents the juice of the meat from flowing out and wasting, and the meat when done is juicy and well-flavored, having lost very little in the process of cooking. During the boiling a scum arises to the surface, and this should be carefully removed; the kettle should be kept covered except when it is uncovered for skimming the surface of the water, as

the steam assists greatly in softening the tough fibers, and the flavor is also better preserved. It would escape into the air with the steam if it were not kept in.

The length of time that the meat should be boiled depends upon its weight. It takes about twenty minutes for the heat to pierce through a piece of meat so that it is ready to begin to cook; reckoning from that time, twelve or fifteen minutes should be allowed to a pound. If the meat is cut thick the longer time will be required; but if it is a flat, thin piece, the shorter time will be found sufficient.

Roasting meat is, properly, cooking it before the open fire, by subjecting it to a high degree of heat; but as this is rarely done in these days of ranges and cooking stoves we bake it in a hot oven and call it "roasted" by courtesy.

Braising is cooking in the oven in a covered pan, smothering the meat in its own juices and having a good deal of seasoning in the dish with the meat.

Broiling is cooking directly over hot coals, and is the quickest, as well as the hottest way of cooking. In nothing is the article to be cooked subjected to such an intense heat as in this process, and it would be quickly burned if the cook did not see to it that it was turned very often. I sometimes think that the majority of people who broil a beefsteak think they must do it literally. I suppose those of you who are French scholars know that the word comes from the French word *bruler*, "to burn;" it also means "to sear," and that is what should be done, the surface seared — not burned — so that all the juices shall be kept inside the meat. Turning it frequently, so that the surface shall cook and not burn, and in this way keeping the juices flowing from side to side, but not escaping, is the true way of making a successful broiled dish. Food cooked in this way should be served at once, on hot plates, from a hot platter.

This much in a general way. I think you will understand from the above, what are the underlying principles of the various processes, and why they are practised. Now for some of the particular rules. We will suppose that you are ready to begin, and that you are to boil a leg of mutton for dinner. You will wipe the meat, remove all the fat, and put the meat into

boiling, salted water, after you have weighed it. Allow ten or fifteen minutes for the heat to penetrate the meat, taking the longer time for a large piece; then skim off whatever may have risen to the top of the water, set the kettle back where the water will simmer, and cook in this way until the meat is done, allowing twelve minutes to each pound. Serve it with parsley or caper sauce. The latter is usually preferred with mutton. To make this sauce or gravy, the following rule will be used. To each cup of boiling water in which the mutton was cooked, add one teaspoonful of flour moistened with a little cold water, one teaspoonful of vinegar, one half a saltspoonful of salt and a speck of pepper. Boil five minutes stirring constantly until smooth, then add one tablespoonful of capers, or of finely chopped parsley.

I think boiled mutton is as easy a dinner to begin with as any meat dish I know of. My own little eleven-year-old daughter came to me the other day, when it chanced that the cook had taken a day to visit some friends, and begged to be allowed to cook the dinner. I had planned for something else, but remembering that the mutton was in the cold closet, I got it out and gave her the directions. She followed them implicitly, and with the tyranny for which cooks are famous forbade me the kitchen. So I was compelled to give directions from the library, and Missy got all the dinner, including vegetables and a rice pudding which was stuffed very full of plums to meet Missy's notion and papa's taste. Of course I enjoyed the dinner, and need I tell you that I felt very proud of the little lady who had been so glad and proud in helping "mamma" through a very busy morning? There is a sequel to this dinner which I will tell you about in the bread-chapter presently.

And now for the lesson in roasting, suppose we take a calf's heart, and make a dish which for economy and delicacy is not half well enough known, although it will be after a few hundred more girls have learned how to prepare it. You must wash the heart thoroughly in cold water, to remove the blood, and cut out the veins and arteries. This may not be a pleasant task to every one, still it is no more unpleasant than preparing fowls or game. Make a stuffing

with one tablespoonful of bread crumbs, one tablespoonful of chopped onions, one saltspoonful of powdered sage, one half a saltspoonful of salt, and a tiny bit of pepper. This you may moisten with milk or water. After it is prepared put it into the cavity caused by the removal of the arteries, and sew the edges together. Slice an onion and brown it in a tablespoonful of clarified dripping; skim out the pieces of onion, reserving them for use, brown the heart in the seasoned fat, then put it with the onion in a deep dish, and half cover with boiling water. Bake in a hot oven one hour, basting every ten minutes, add more water if necessary. When the heart is done you may make a gravy by thickening the water that is left in the dish with a little flour wet in cold water, just as you did in the mutton gravy. You will find this a very nice occasional dish for dinner, and a very inexpensive one.

You will observe that the rule gives clarified drippings as a proper fat for browning the onion and meat. You will, perhaps, like to know how the fat is clarified. Save any pieces of fat—excepting mutton—cut into half-inch cubes, and put them in a pan, covering them with cold water. Put the pan in the oven and cook slowly for four or five hours, or until the scraps are quite brown and the water evaporated. Slices of raw potato put in with the fat, also assist in the clarifying. When it is slightly cooled, but not beginning to harden, strain into an earthen jar or bowl and set aside for use.

And now suppose you wish to cook a beef-steak for breakfast. You will wipe the slice with a clean damp cloth—always, you see, this must be done with all meat, for you do not know what hands may have touched it—reserve the superfluous fat, and the bone. Grease the bars of the gridiron with some of the fat. Broil over a clear fire, not letting the gridiron out of your hands, and turning every time you count ten. If you like your steak rare cook it about four minutes, that is if it is of the right thickness, which is from three quarters of an inch to one inch; but taking a longer time if you wish it well done. Serve at once on a hot platter, and season with salt, butter, and a little pepper. You must give your undivided attention to steak if

you wish it good. In fact its price, like that of liberty, is "eternal vigilance."

This is another way of broiling, that is called "pan broiling." This is done in a frying-pan or on a griddle. It is heated hissing hot, the meat is put on it, without any fat, cooked one minute, then turned the other side round, then cooked until done, turning very often. When properly done it has the flavor of steak or chops cooked over the coals.

And now for some of the ways of warming over the meats; preparing the "made-overs" or *réchauffés*, as the French call them. We will suppose we have some of our boiled mutton left. I will give you three ways in which you may use it. First is minced mutton on toast. Remove all the fat and gristle from the cold mutton, and chop it fine. To one cup of the meat, add one salt-spoonful of salt, a speck of pepper, and one half a cup of the thickened gravy. Heat quickly in a saucepan, and pour over slices of toast. Serve hot.

The second way is a "cottage pie," and this, by the way, the cooking-school girls are very fond of doing at home. Prepare the meat as for the minced mutton or toast. Boil and mash some potatoes—you have already learned how to do that; to every cup of meat add one half a saltspoonful of salt, a bit of pepper, a little nutmeg—or if preferred a teaspoonful of chopped onion—and one half a cup of gravy. Put the meat, seasoning and gravy in a pie dish, cover it with mashed potato and bake in the oven until the potato is a golden brown.

Next comes scalloped mutton. Cut the cold mutton into small thin pieces, removing all the fat and gristle. Put a layer of bread crumbs in the bottom of a shallow baking dish, then a layer of meat, a very thin layers of crumbs, then gravy. Alternate these layers until the dish is full, spread buttered crumbs on the top and bake until the crumbs are brown.

I would very much like to hear if any one tries any of the dishes, and what the result is.

Sallie Joy White.

THE BRAGANZA.

(Stories about Famous Precious Stones.)

IF the stone which is known by the name of the "Braganza," or the "Regent of Portugal," is a diamond, it is undoubtedly the largest that was ever found in either ancient or modern times. But then it is by no means certain that it is a diamond at all. It would be quite easy to establish the fact by submitting the stone to the examination of experts, but apparently the Royal House of Portugal holds that the Braganza, like Cæsar's wife, should be above suspicion. At all events the fact remains that this monster diamond has never been seen by any independent expert whose judgment would be accepted without appeal. When the learned are in doubt it would ill become us to decide; therefore, without offering an opinion, we shall, provisionally at least, class the Braganza among the diamonds of this series; and when its true character is established beyond dispute we shall

know whether to call it the Monarch of Diamonds or only a vulgar impostor.

The stated weight of the Braganza reaches the astounding figure of one thousand six hundred and eighty carats. Of course this is in its rough state, for the giant gem has refused to trust itself to the hands of any cutter however skillful. Yet this weight exceeds by more than double the weight, in the rough, of the next largest diamond known to history, namely, the Great Mogul. When we think of the price of the Regent—over six hundred thousand dollars, while weighing only four hundred and ten carats in the rough—and then turn to the Braganza with its sixteen hundred carats, the mind staggers before the money-value thus suggested.

All the other famous diamonds of which we have treated have been Asiatic; but the Braganza, like the Pelegrina Pearl, hails from the New

World. Consequently its history does not reach back into those misty past ages whither we went groping after the Orloff and the Koh-i-nûr. The Braganza is a diamond of yesterday, hence the account of its finding is clear, minute and accurate.

Here it is. The speaker is Joseph Mawe, a geologist, merchant and traveler who visited Brazil in the first decade of this century and whose book on the countries which he saw is our best authority on that part of South America.

"A few leagues to the north of the Rio Prata is a rivulet named Abaité, celebrated for having produced the largest diamond in the Prince's possession, which was found about twelve years ago (namely 1797). It may be allowed me in this place to relate the particulars as they were detailed to me during my stay at Tejuco. Three intelligent men having been found guilty of high crimes were banished into the interior, and ordered not to approach any of the capital towns or to remain in civilized society on pain of perpetual imprisonment. Driven by this hard sentence into the most unfrequented part of the country, they endeavored to explore new mines or new productions in the hope that sooner or later they might have the good fortune to make some important discovery, which would obtain a reversal of their sentence and enable them to regain their station in society. They wandered about in this neighborhood, making frequent searches, in its various rivers, for more than six years, during which time they were exposed to a double risk, being continually liable to become the prey of the *Anthropophagi*, and in no less danger of being seized by the soldiers of the Government. At length by hazard they made some trials in the river Abaité at a time when its waters were so low, in consequence of a long season of drought, that a part of its bed was left exposed. Here while searching and washing for gold they had the good fortune to find a diamond nearly an ounce in weight.*

"Elated by this providential discovery which at first they could scarcely believe to be real, yet hesitating between a dread of the rigorous laws relating to diamonds and a hope of regaining their liberty, they consulted a clergyman, who advised them to trust to the mercy of the State, and accompanied them to Villa Rica where he procured them access to the Governor. They threw themselves at his feet and delivered to him the invaluable gem, on which their hopes rested, relating all the circumstances connected with it. The Governor astonished at its magnitude could not trust the evidence of his senses, but called the officers of the establishment to decide whether it was a diamond, who set the matter beyond all doubt. Being thus by the most strange and unforeseen accident put in possession of the

largest diamond ever found in America, he thought proper to suspend the sentence of the men as a reward for their having delivered it to him. The gem was sent to Rio de Janeiro, from whence a frigate was dispatched with it to Lisbon, whither the holy father was also sent to make the proper representations respecting it. The sovereign confirmed the pardon of the delinquents and bestowed some preferment on the worthy sacerdote."

Such was the finding of the Braganza about ninety years ago.

The Prince referred to in Mawe's account, was John VI., who, in 1792, was declared Regent owing to the mental derangement of the Queen Maria Isabella, his mother. He was a great diamond-collector, not so much from love of the glittering gems themselves as for the wealth they represented. As Brazil was rich in diamonds, and as all the proceeds from the mines were submitted to His Highness before being sent out of the country, he had ample opportunity of forming an extremely good collection. According to Mawe it was the Regent's practice to retain for himself all the large stones, with the result that his treasure-chests contained the most splendid collection of diamonds known in modern times.

In 1809, Napoleon, by one of those pithy orders of the day which so delighted his armies, declared that "the house of Braganza had ceased to reign," and the house of Braganza forthwith proceeded to give truth to the declaration by withdrawing itself from Portugal. On November 9, John VI., the former regent, who had become king upon his afflicted mother's death, sailed for Rio Janeiro. And he remained there until 1821, when the clamors of his European subjects compelled him very reluctantly to come back to them.

It is probable that in this not over-valiant flight to safer climes King John carried the Braganza back to its native land. But whether in Lisbon or Rio Janeiro the Braganza was more a wonderful legend than an actual stone, for it was always kept secluded in the strongest safe of the Treasure Chamber. The Prince showed some of his diamonds to Mawe, but the latter in an emphatic foot-note says "I did not see this diamond (the Braganza) when in Brazil." On gala days John wore the royal gem around his neck, and for the purpose of suspen-

* "This is either a misprint or a gross mistake. For as there are one hundred and fifty carats to the ounce it would be more correct to say 'nearly a pound in weight.'"

sion it had a small hole drilled through the top. A large rough diamond nearly a pound in weight, hanging from the neck by a string of gold, would seem to our thinking to be rather a barbaric ornament for a civilized monarch to wear.

The diamond mines of Brazil, which were discovered in 1727, yielded an extraordinarily rich harvest during the first years of tillage. In 1732, no less than eleven thousand ounces of these precious stones were shipped from Rio to Lisbon. But this influx of diamonds created something like a panic among the merchants of Europe, and to save their precious goods from a disastrous fall in price they formed a league of defamation. All kinds of reports were circulated about the new comers — that they were defective, that they were ill-colored and finally that they were not diamonds at all. These reports gained belief, and purchasers refused to buy the Brazilian gems. The malicious libels of the European merchants were cleverly defeated by the crafty Portuguese. Since Europe would have none but Indian diamonds Brazil must needs furnish none other. The diamonds from Sierra do Frio were secretly conveyed to the Indo-Portuguese settlement of Goa; then they were sent inland, made up in the recognized Indian style as parcels of Oriental gems, and thus doctored they appeared in Paris and London. There a credulous public eagerly bought them up at the high prices due to undoubted Indian diamonds. Once the western gems were fairly accepted, the Portuguese threw off the mask, no doubt laughing heartily at the stupidity of the out-witted merchants, and Brazilians are now treated as fair and honorable diamonds. All that is to say except the tremendous Braganza which is persistently sneered at and doubted by many writers.

Mawe describes at great length the diamond diggings of his day, and as human nature varies little, it is probable that his picture would be recognized even now as a truthful likeness of those localities and their inhabitants. He says that, notwithstanding the rich produce of the ground the inhabitants are mostly poor and wretched. Many of them drag out their lives in misery and idleness in the hope, which is never realized, of one day finding a great diamond which shall make them rich and happy

forever. The actual work is done by slaves under the eye of overseers, who are supposed to be of unimpeachable integrity and sleepless vigilance. The traveler gives some astonishing details by which the measure of the former quality may be taken. He observes that as the produce of the mines was all Government property and there being the severest laws against smuggling, he expected to see (at the mining district) no gems except those in the official treasury. This expectation however was quickly dispelled, for he found diamonds to be the current coin of the place. Even the mere word *grimpiero* (smuggler) seemed to throw the inhabitants into a sort of fit; they writhed about, smote their breasts, called upon the Virgin and all the Saints to bear witness to their horror of this the greatest sin possible to a human being. Yet they all smuggled diamonds, from the slave at the washing-trough to the priest officiating at the altar. Mawe, who had considerable influence at court, was the first mere traveler who ever visited the mines, and it is probable that he was the only person who ever went there without smuggling. He remarks that he found it safer to see nothing of that which passed under his very nose.

In order to encourage honesty among the slaves, the finders of large diamonds were rewarded in different degrees according to the size of the stone. The finder of an octavo (seventeen and one half carats) was crowned with a wreath of flowers and carried in procession to the administrator who gave him his freedom and two new suits of clothes. The fortunate negro, moreover, then received permission to work in the mines on his own account.

During Mawe's stay at Tejuco a negro found a very large diamond, which with much eagerness he took to be weighed.

"It was pleasing to see the anxious desire of the officers that it might prove heavy enough to entitle the poor negro to his freedom, and when on being delivered and weighed it proved only one carat short of the requisite weight all seemed to sympathize in his disappointment."

Even now after all these years one cannot help feeling regret for the high hopes of that humble slave so sadly blighted. But those who build their fortunes on diamonds are sometimes

bitterly disappointed. Harken to this anecdote from the pen of the same traveler in Brazil. He was waiting for an escort to the mines and had meditated taking a couple of soldiers, when a singular occurrence furnished him with two miners who were appointed to attend him, and whose conduct he pleasantly says deserved every commendation. A free negro from Villa do Principe, some mine hundred miles from Rio Janeiro, wrote to the Prince Regent that he had in his possession an amazingly large diamond which had been bequeathed to him by a friend. The negro was desirous of personally offering it to the Prince whose fondness for diamonds was pretty well known. The Prince commanded the negro to come to the capital immediately, and as the recognized owner of an immense diamond must not travel meanly, he had a carriage and escort given to him. After twenty-eight days of traveling, during which time he was the envied of all beholders, he arrived at Rio Janeiro and was straightway brought to the palace and speedily thereafter into the presence of the Regent. His Highness, well accustomed to large gems, since he used to wear the Braganza around his neck, was nevertheless astonished at the size of this new diamond. Everybody stood with bated breath to hear what he would say, while a few clever ones estimated its value in unheard-of millions. A round diamond was of itself an almost miraculous thing, nobody having ever heard of the like before.

However, it was sent under guard to the treasury, and the next day Mawe was invited to inspect the great novelty and to give his opinion upon it as a geologist. Armed with letters and permits the distinguished stranger went to the treasury and was solemnly introduced into its innermost recesses. He was politely received by the treasurer who explained everything to him, showing him the jewel-chests each fitted with three locks, the three keys of which were held by three different officials.

"One of these chests being unlocked an elegant little cabinet was taken out from which the treasurer took the gem and in great form presented it to me. Its value sunk at the first sight, for before I touched it I was convinced that it was a rounded piece of crystal. It was about an inch and a half in diameter. On examining it I

told the governor it was not a diamond, and to convince him I took a diamond of five or six carats and with it cut a very deep nick in the stone. This was proof positive. A certificate was accordingly made out stating that it was an inferior substance of little or no value, which I signed."

Then the geologist went home and wrote a letter setting forth this unwelcome fact as delicately as he could, for he knew that his letter would be to shown to His Highness, and it is at all times an uncomfortable task to tell disagreeable news to a king. However the Prince Regent was high-minded enough not to be angry with him. But great was the disappointment of the unlucky negro. For years he had been building hopes upon that round diamond, and now to see them vanish before the geologists "deep nick" was trying indeed. Instead of being fêted and feasted and loaded with rewards, he returned home unescorted and empty-handed to be possibly laughed at by those very persons who had formerly envied him.

As a set-off to the deep disappointment suffered on account of this supposed diamond we may mention the finding of another South American stone which was attended with far different results. A negress working at the mines of Minas-Geraes in 1853 picked up in her trough a stone two hundred and fifty-four and one half carats in weight, which proving to be an undoubted diamond obtained freedom for the woman, and afterwards a life-pension. Her master sold the diamond for fifteen thousand dollars, and the buyer immediately obtained one hundred and fifty thousand dollars for it. After being cut by Voorsanger, the same workman who manipulated the Koh-i-nûr, it proved to be a white stone of uncommon beauty and lustre. Under the name of the *Estrella do Sud**

* The naming of diamonds is an art wherein there may lie fitness as well as unfitness. Historic stones frequently bear the name of their first well-known owner, as for example the "Regent," the "Orloff," the "Braganza," and many others. Again they may bear names indicative of their character as "Austrian Yellow," "Dresden Green," "French Blue," or yet again their names may be purely fanciful. Of this latter class there are numerous examples. The above "*Estrella do Sud*" is one, the "*Koh-i-nûr*" is another. When fanciful names are given we hold emphatically that they should always be in the language of the person who bestows it. As a historian we protest against needlessly confusing the already intricate annals of diamonds by giving to American gems fine names fetched from Persia. The largest diamond found in the United States weighed in the rough twenty-three and three fourths carats and rejoices in the superlative appellation of Oninoor (Sea of Light.)

(Star of the South) it attracted much attention from amateurs and was eventually bought by an Indian rajah for one hundred and forty thousand dollars.

Notwithstanding the lofty attitude of judicial impartiality which we endeavored to assume at the beginning of this article, a lurking suspicion remains in our mind that had the Braganza, like the round stone before described, been subjected to the keen scrutiny of Mawe's scientific eyes, it would no longer be classed among the most remarkable diamonds of Europe.

Considerable difference of opinion exists as to the fate of the Braganza after King John's death. Did he give it to Don Miguel his second son? or was it a crown jewel and as such did it devolve upon Don Pedro the eldest along with the kingdom of Portugal? Don Pedro preferred the young empire of Brazil to the old kingdom of Portugal, which he gave to his little daughter Donna Maria da Gloria for whom he contracted that unnatural marriage with his own brother. The house of Braganza was divided against

itself for many years during the first quarter of this century and very nearly came to destruction thereby. The diamond which goes by the family name did not meddle in these politics, but lived in modest retirement, wherein it differs remarkably from the other diamonds with which we have already become acquainted.

Indeed the Braganza stone leads so secluded a life that its very form is not distinctly known, but is said to be octahedral, a type of crystallization frequently met with in diamonds and topazes. Its color is likewise subject to variation; some writers declare it to be white, and others again aver that it is deep yellow. As to its valuation — that is mere guess-work under the circumstances of ignorance in which we all flounder. Romé Delisle raises his estimate to the enormous figure of fifteen hundreds of millions of dollars, while Jeffries lowers his to the more modest sum of twenty-five millions. Even this latter amount is a good deal to be locked up in so small an article as a stone eleven ounces in weight.

Mrs. Goddard Orpen.

ABOUT WALKING.

(Ways To Do Things.)

WHILE we are very young, a great deal of attention is paid to our tongues and our legs, and everybody is anxious that we shall learn to use both skillfully. But as they knock about the world, they grow often rough or silly, and lose their manners; so that our speech gets to be a jargon which our English-speaking relatives are still kind enough to understand, and our gait develops into a business of slouching and mincing and toeing-in, which must make cats, for instance, who walk beautifully, think sarcastic things of us.

"Practice," Mr. Emerson said, in one of his sharp sentences, "is three fourths." That will make a very pretty proverb. Whatever you do most, you do best; so if you walk much you must, in time, walk well. Everybody parades the street on stumps or spindle-shanks; but real

walking on real legs is a fine art, and a rare one. Society has next to nothing of it, and the stage has all it wants. Actors do much of our orthodox talking and walking, and imitate us, often, as we ought to be.

The main thing to remember, in our career of reform, is to walk with the whole leg, from the hip; to hold the head up, and the shoulders back, and to let the body poise and balance itself from one foot to the other. Our dear friend Doctor Holmes has pointed it out somewhere that one step is a fall, and that the second step, close upon it, is a recovery; so that as we make our mortal way we are forever running a risk, and forever being saved. The step itself should be long and swinging for long legs, and shorter and more decided for short legs, which can often walk the faster. In any case, push

downward every time from the ball of the foot, just before the same foot goes forward; when that becomes habitual, you have your diploma as pedestrian. You know that a fine runner will never touch heel to the ground; in walking, too, the heel should almost be counted out, and, above all things, never strike ground first. Mount once the smooth pavement of a rather steep hill, standing erect and keeping your heels up all the time; and if you reach the top you are either a Spartan or a born walker.

Constant and careful walking, like military drill, will give a good carriage to anybody (a fig for carriages of the commoner sort in comparison!) and it trains the whole person to quickness and grace. Flapping arms and big feet belong to the walker; whoever has a prejudice against these elegances had better stay indoors. If arms hang loosely by the side their natural impulse is to swing, while the legs do; and feet, certainly, with their rising muscles, will broaden and deepen, if the boots worn in the beginning are honest boots, and give them a chance.

A great deal depends on shoe-leather, if we would get comfort and avoid injury. We are in a lively climate, which does not encourage us to wear the beautiful sensible sandals of the Greeks and Hebrews. It was the advice of an forgotten young soldier to our marching volunteers of the Civil War: "Trust in God; but keep your shoes easy." We must not have errors in our premises; a corn is a fatal error to a walker, and there is one sort of Pilgrim's Progress which disowns the very name of bunion. Therefore take to square low heels, wide soles, and ample toe-room. (We shall have an excellent company on the road, because all the vain people will be scared away.) Wear loose, short warm clothes, if the weather be cold; but heavy ones, never. Light flannel is capital, all the year around. Caps are better than hats, by land as by sea; for the wind cannot catch at them. One's stockings are apt to bunch and feel uncomfortable on a long tramp. But if before starting you *soap your feet*, fore and aft, so that they are cased in lather, they will keep cool and easy under you from morning till night. "Break an egg in your boots!" said James T. Fields, who was a boy all his life. But whichever you do, you will find it a great help and conven-

ience, though the prescription may seem queer to a novice.

When you start off of a brisk morning, on a fair road, with a luncheon perhaps for baggage, what do you want to see, and how far do you want to go? Think it over, and figure it up; it is great fun to walk on system. Of course, if you are bound on a Maying excursion, or on a stroll, that is a different thing. You can best enjoy scenery, or buildings, or what not (except a street procession), from the ground. The eye is twice as clever, to make a bull, on foot. The true travelers are men like Bayard Taylor, trudging it through Europe and meeting life on its own level. Horses and bicycles are very jolly, no doubt; but to be your own hoof and wheel is a haughtier luxury still.

Any hardy-grown boy or girl can easily do three miles an hour, which, though not rapid, is an excellent pace, *kept up*. If you want to make a walk on trial, to see in how far your strength is willing to serve you, choose a smooth road, a cool day (October and April are the walking months) and some apples, if you are addicted to them, like our patron Atalanta; and then begin just as you mean to end. Stop whenever you like; but do not hurry or slacken for a moment. If you study music, you know what *tempi* are; well, now, be your own conductor, and set the time for this one movement of those faithful double-basses, your legs. *Allegro giusto* is the thing, quick and steady. Before you know it, and without altering the measure one jot, you will have so much spring in you, and so free a step, that you will cover four miles an hour, or a trifle over. On a pinch, you can go beyond that! but not with so much dignity, unless you aspire to rival a professional Mr. Powell of London, long quiet in St. Paul's churchyard, of whose feats (how odious puns are when you don't intend them!) you may have heard. Four miles an hour, for five consecutive hours, is as much as the heartiest of you, ought to attempt. But if you walk every day, you can soon be as clever as the famous brook, and "go on forever."

If you come home with an ache, you are overstraining yourself; and nothing in the world is more foolish and criminal than that. A stretch of from twenty to thirty miles, in pure air, and with a companion who can no more bore you

than trees or water can, ought to leave you in a glorious mood — tired indeed, but not tired out — and ready to sleep and eat tremendously. You ought to be thoroughly in tune, so that no further exertion would come hard, and so that rest would be the very top of luxury. If you feel otherwise, you must not put in an appearance yet at the reunion of the Walker family.

It is our rude creed that legs were made to walk, as naturally as lungs to breathe. And that

if ailing people would only saunter abroad a little every day, they might never need horrid sick-beds at all. And that a girl who foots it like a gypsy across country, and is happy without gloves, veils, and toggery, will mean salvation and sense and health to many in this world. And that a boy who strides along against the wind for his pleasure, will not spoil at Capua, nor be likely to lose his uprightness and pluck in any path hereafter.

Louise Imogen Guiney.

"A BUSHEL OF OLD BONES."

(Geological Talks.)

ONE lovely summer afternoon Frank and I started from Philadelphia for a tramp through the marl district of Southern New Jersey. We went over the ferry to Camden and there took train for Woodbury. Reaching there at about four o'clock in the afternoon, we struck across country for Mullica Hill. It was not a long walk and it was summer-time so we took it easily. Presently we saw out in a field, a pile of dirt sprinkled with white. Feeling sure it was a pile of marl, we cut across fields to it. We were not mistaken. It was a heap of "shell-marl," and we sat down by it and spent some time picking out oyster shells of different kinds. At last we started on again and reached Mullica Hill just as it was dusk. This is a queer old town, straggling for a mile and more along its one street, with an old-time tavern near one end. The old house was welcome, however, as we were warm and tired and we ate our late supper with a hearty relish and enjoyed a good night's rest.

We spent the next day on the bank near the creek that flows through the town. The material of this bank varies somewhat. Though marl it is harder and more compact than at most places. We took a pick, a crowbar and a hammer and got to work. The small boys of the town turned out in full force — some to sit at the top of the bank and look on and some to help. Half a dozen took hold in earnest and

we all were as busy as ants. With pick and crowbar we loosened great masses of the hard marl or of the harder rock, which went rolling down to the bottom of the hill. There we broke them up with our hammer and picked out now a petrified shell prettily coiled, now a cast of some old-time oyster and now a belemnite, looking for all the world like a petrified cigar. The belemnites here, however, are very soft. They crumble and break as one tries to get them out and leave only the queer little conical casts made in the upper end of the shell. We spent a couple of days working on this bank and then started for Woodstown where the great marl beds are. On the way we stopped at several other diggings.

"Marl" or "greensand" such as they find here, is, at most places where it is dug, a curious dark-green granular earth. When moist, it sticks together fairly well, but when dry it crumbles away between the fingers. There is considerable variety in it as regards color, firmness, texture and so on. There are marls found yet further south in New Jersey, newer than this, and of all colors — red, blue, yellow, brown — but it is only the greensand marl that I was after on this trip. It is generally soft enough to be dug out with spades or scoops and excavators. It contains materials of value as fertilizers and is therefore dug and sold to farmers. The green grains of the marl are silicate of iron

and phosphates. If we could examine them under a microscope we would probably find that each little grain was a delicate cast of the interior of a minute shell.

The diggings at Woodstown are very large. The openings extend for two miles or more. Many of the old ones are now deserted and filled up with water. We wandered around among these "pits" and examined the waste piles and the walls of the diggings and found good belemnites. We picked out, too, a handful of sharks' teeth, beautiful, sharp-edged, black-enameled, cutting triangles. Some had only a single cutting cone; others had a smaller one on each side of the base of a central one; some were broadly triangular, others narrow and slender. We picked out some shells, too, and casts made within old oyster shells.

We spent nearly a whole day here and on our way back to Mullica Hill struck several things of interest. There was a great pile of "shell-marl." The sand itself was scanty and the heap was almost entirely composed of queer, thin, irregular oyster shells like crooked, over-grown, monstrous toe-nails. That is not an elegant comparison, but it is true. At one place we went up to a farmhouse, where, we were told, a man lived who owned a marl pit. We asked him if he had any specimens? "O, yes!" "May we see them?" "Yes," and he brought out a bushel-basket full of old bones—vertebræ mostly, or the bones that make up the backbone. Beauties they were, each as large as my fist and some perhaps larger. There were a few ribs too. Probably the whole backbone and trunk bones of some old monster. They were just what we had been seeking all day.

The farmer, however, was not prepared to let me have them. I begged him to sell them to me, but in vain. Some one had told him that such specimens ought not to go outside of New Jersey or Philadelphia, and he was firm. So I had to take my pleasure out in looking at them, handling them over, longing for them, but not in owning them. There I left them, and unless some Jerseyite or Philadelphian has come along, I suppose that basket of dry bones still stands behind the door in that old shed.

Those old bones represent a type of animal life whose history we shall now trace. It is an inter-

esting one to follow. They were bones of some old reptile which lived in a time after the old ganoid fishes and before the wool-covered mammoth. A strange time it was. From the vast number of reptiles then living it is called the Reptilian Age. Nowadays we have not many reptiles—the turtles, snakes, lizards and crocodile-like forms are all. Snakes, too, are new-fashioned and so are turtles. While some turtles lived in the Reptilian Age, they were not very noticeable. When these greensand marls were forming at the sea-bottom, there were reptiles, reptiles everywhere. In the sea water, in streams and marshes, on dry land, in the air—there was no place where reptiles were not to be found. Perhaps there were some mammals but, if there were, they were small forms and low and of no great importance in the world. The reptile was master. In the sea swarmed fishes, new-fashioned, even-tailed forms, and sharks—you remember we found their sharp, cutting teeth at Woodstown. Plenty of shell life, too, was present, and corals, but the great forms, the ones you would quickest notice if you could view a scene of that time, were reptiles.

New Jersey was a very paradise for them. Let us try to populate it, in our minds, with its old forms. We stand upon the seashore. Back inland are low, level plains covered with a growth of willows and maples, sassafras and tulip-trees. Mingled among them are strange screw-pines and a somewhat abundant growth of ferns. Between us and this vegetation is a low swamp, and between the swamp and the sea is a long muddy beach, bare now because the tide is out. Some wading birds are just settling down in the swamps, hunting for a dinner. See that ripple on the surface—with a quick, sudden rush a great crocodile shoots through the water. It misses its prey this time, however. You can see the monster's head above



the surface of the water. See how curiously fluted its teeth are. Other snouts appear here and there—some long and pointed; others more blunt. They are all alligators or crocodiles. At least six kinds live here.

A noise in the water behind us attracts our attention toward the sea and we turn to catch



sight of one of the most remarkable monsters of the time—the tremendous Mosasaur. Fifteen kinds lived in New Jersey waters. This is one of the largest. It is full eighty feet long and snake-like. He coils and twists and writhes through the shallow water. He has four small paddles which help him to make his way. His body gleams and glitters in the sunshine, for he is covered, at least in part, with small, overlapping bony plates. His teeth are a terrible array. Nor is the set of conical teeth all he boasts, for he has also two rows of hideous fangs fastened in the roof of his mouth! His jaws are most curiously jointed, too, so that they may act like arms to push any unfortunate victim he may capture further and further into that frightfully armed maw. Here is another sea-reptile, a swimming monster with great staring eyes and strong paddles, but no teeth in his jaws. There is another, more graceful, and smaller, whose little head is set upon a long slim neck.

Turning, we pass around the edge of the marsh and walk back into the woods. There is by far the strangest object yet. The Hadrosaur—a giant indeed—a great reptile, four-legged, but walking only on his hinder ones and holding up the front limbs somewhat as does a kangaroo. He is twenty-eight feet long at least and, as he stands half erect, his little front feet scarcely active, with his bulk firmly supported by his huge hinder limbs and his massive tail, he measures ten or fifteen feet high. Going to that largest tree, he rests his front feet against its trunk and begins to crop off leaves, twist off

twigs and eat his breakfast. Soon he is entirely absorbed in his meal. He is not to be left alone however, for here comes a stranger. It is the Laelaps, a reptile that also walks on his hind feet. Not so large as the Hadrosaur, he still measures more than twenty feet in length and carries his head full twelve feet in the air. His attitude is threatening and his teeth gleam, while he sneaks and steals through the underbrush making as little noise as he can. His sharp teeth show that he eats a different diet from the leaf-eating Hadrosaur. He is a hunter, a meat-eater. When quite near the unconscious browser, he stops, fixes for a spring, gives a sudden leap forward and comes down upon the Hadrosaur. A struggle ensues but, more fierce and active, the Laelaps is master.

Such as here described was New Jersey, when the marl of the marl pits was being laid down.

Look for a moment with me at Kansas. Then the Gulf of Mexico reached northward in a narrow inland sea and covered much of that State. Here, too, we find giant reptiles. Here are Mosasaurus and crocodilians and smaller Hadrosaurs. But here we see what we did not see in New Jersey. Here are the strangest of all reptiles—bird-like forms, flying in the air. There goes one which is at least twenty feet in expanse of wing from tip to tip. It flies by means of broad membranes, tough and leathery, not like the wings of birds, but somewhat like those of a bat. It is not exactly like a bat's wing, which is a membrane stretched over all the fingers of the hand. It is spread from the outer finger which is very long to the side of the body and to the lower limb. The other fingers of the upper limb are left as

claw-like organs for grasping or climbing. The bones in this reptile are light as they contain much air. The head is long and bird-like. Its tail is very short and slender. There are no teeth in its jaws which are thus somewhat like those of a bird. Perhaps these were sheathed in a horny material as a bird's are. Altogether this is a very remarkable creature.

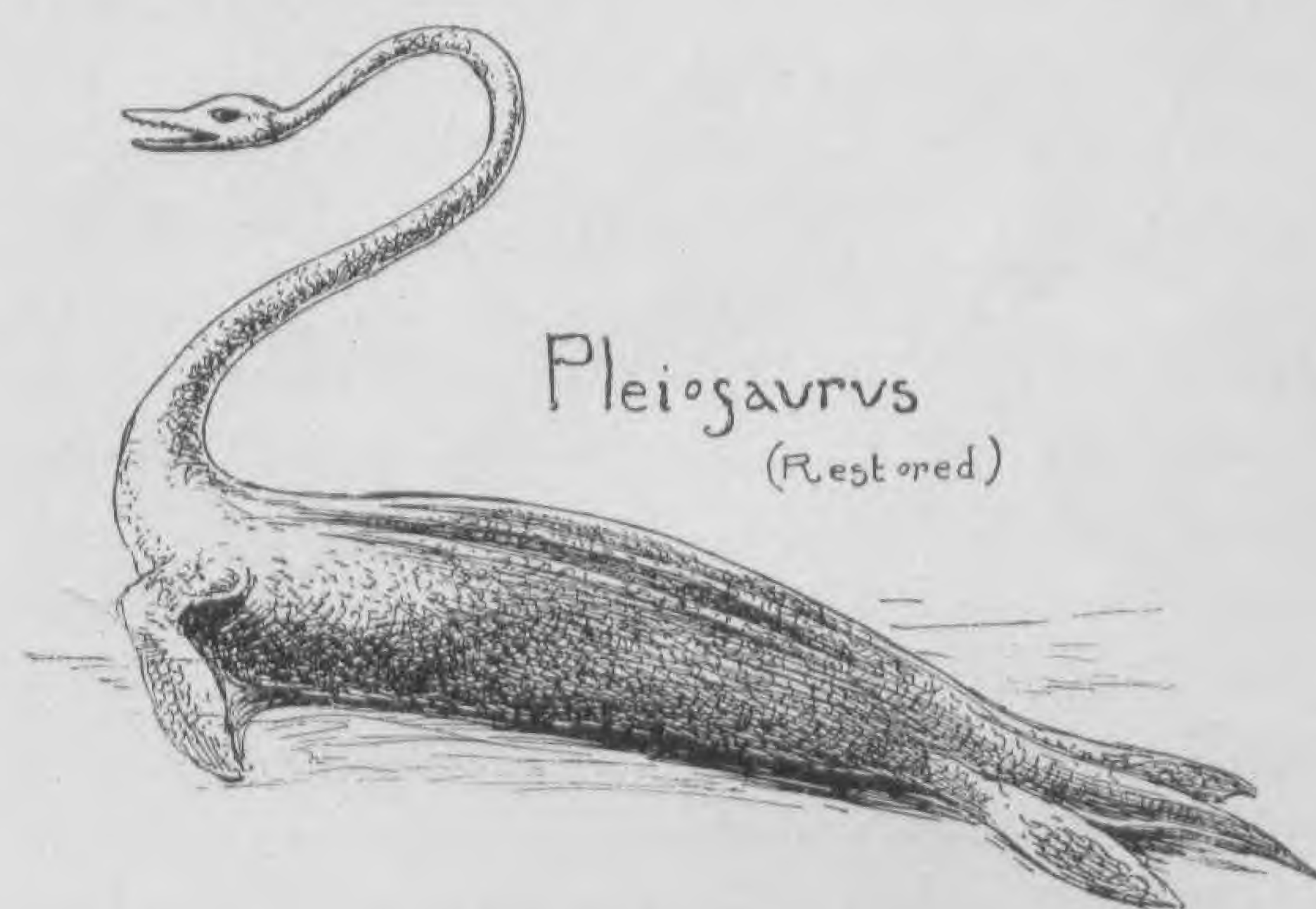


Not only in America was this time an age of great reptiles. In Europe, too, they swarmed in the seas, filled the air, and crushed through the woods. In England the Megalosaur took the place of the Laelaps and the Iguanodon that of the Hadrosaur. There are some European forms to which we shall especially refer. One was an immense sea lizard—the Ichthyosaur. Its remains frequently occur in the Lias rocks at Lyme Regis, England, and elsewhere. Whole skeletons are found with the bones in proper position. It was a stout-bodied form, without a distinct neck. It was probably covered with a thick skin without plates. The bones of the backbone were like those of fishes, being hollowed at each end. The skull was long, pointed, and had great sockets for the eyes. The eyes themselves were enormous and were surrounded with a strange ring of bony plates set into the outer layer of the eyeball. These plates were movable and by narrowing or widening the eyeball, lengthening or shortening it, adjusted the eye to see objects, either at a distance or near by. They also enable the eye to withstand the great pressure felt in deep water. This shows that the creature may have been a great diver in the open sea. This reptile has four stout paddles, the skeleton of each of which is composed of five rows of small bones. It must have been a great swimmer and in addition to its paddles it was aided in swift movement through the water by a strong tail-fin which was compressed and flattened from side to side and well adapted to propel the animal forward. While it may have been able for a time to live out of water, it must have been awkward and clumsy in its movements on land. It was an eater of fish, smaller reptiles and mollusks and was doubtless very voracious. Though no true Ichthyosaurs occur in New Jersey rocks, forms very similar but toothless are known, as before described.

The Plesiosaur is another form which was strikingly abundant in Europe, though it also occurs in New Jersey. It lived in the same seas as the Ichthyosaur and was doubtless often attacked by it. Though very large it was a comparatively delicate and weak form. It is supposed that it, too, was covered by a scaleless skin. Its vertebræ are not fish-like. Its head

is set upon a long, many-jointed neck. Though the orbits are large the eyes are not so huge as in the Ichthyosaurs nor have they bony rings for adjustment or withstanding pressure. It, too, has four paddles, but they are comparatively long and slender. The head is very small and delicate for so large a creature. Twenty kinds are known, some of them nearly twenty feet long. One who has made a careful study of them says:

"Perhaps it swam upon or near the surface, arching back its long neck like a swan and occasionally darting it down at the fish which happened to float within its reach. It may perhaps have lurked in shoal water along the coast concealed among the sea-weed and raising its nostrils to the level of the surface from a considerable depth, may have found a secure retreat from the assaults of powerful enemies, while the length and flexibility of its neck may have compensated it for the want of strength in its jaws and its incapacity for swift motion through the water."

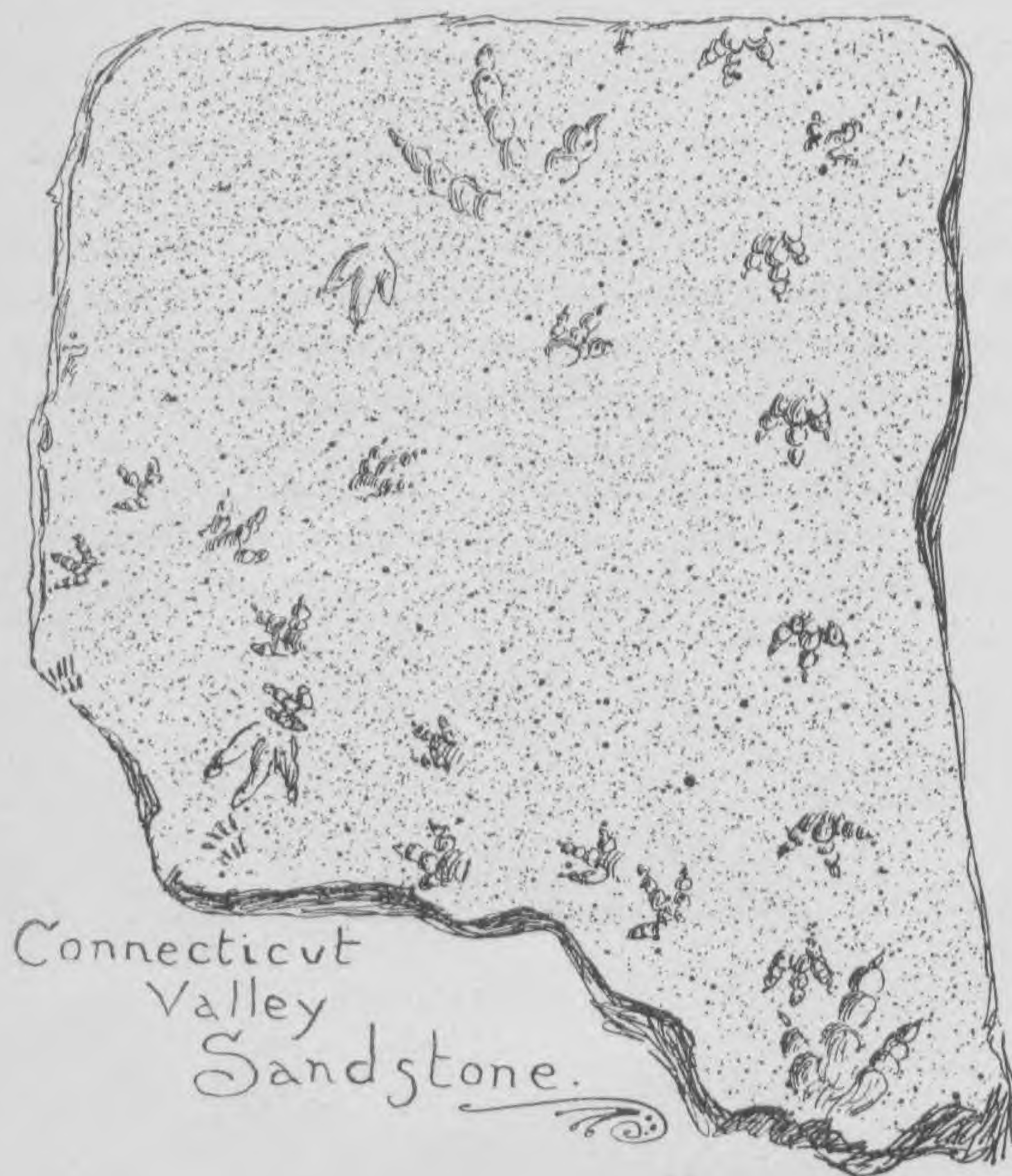


The last European form I shall mention is the Pterodactyl, much like the Kansas flying forms or Pteranodons. The main difference is that these in Europe had teeth in the jaws. All these flying forms were much alike and could fly, climb or cling to trees and rock cliffs by their claws, and could perhaps swim.

Among the most curious of those old-time reptiles are some found in the rocks of Southern Africa. They are best known from skulls, though other parts have been found. These tell us of forms, some of which had no teeth at all, but whose jaws were beaked and perhaps inclosed in horny sheaths, like a bird's or turtle's. Other kinds had two large teeth in the upper jaw, one on each side, growing into tusks.

These were not water-forms, but were supplied with well-developed limbs suited for walking.

There is nothing that we learn from the rocks that is more quaint and curious than this "Age of Reptiles" — so much unlike our own time. No men, few or insignificant mammals, a vegetation quite different from that now prevailing, and everywhere these strange and



mighty monstrous beings as the lords and masters of the animal world!

One last point. We are struck by the fact that so many of these forms so nearly approach birds in their structure. As we look at modern reptiles — snakes and turtles and lizards — and compare them with the birds, no two types of animal structure could seem more different.

Here, however, we meet bird-suggestions at many points. The Connecticut River Valley contains many brown sandstone quarries. When a new layer of rock is uncovered in the quarry, there are often found impressed in the solid rock footprints, some gigantic in size and three-toed. The finest collection of these interesting tracks is in the cabinet of Amherst College. Years ago Dr. Edward Hitchcock made a most elaborate study of them and classified them and wrote a book upon the subject. He thought many of them were made by birds. Now, however, we know that most if not all were reptilian. You remember that many of these reptiles walked on their hind limbs only and as they had three-toed, bird-like feet, their tracks might readily be misunderstood. If we had a full series of all these old reptiles that are known, we would find two groups which were bird-like. One group through such forms as Hadrosaur and other forms walking erect would lead to *Compsognathus*, a little form which in its shape and mode of movement would suggest a small ostrich. The other group is made up of "winged" or flying forms, *Pterodactyl* with teeth in its jaws and *Pteranodon* without teeth. We shall find later that at this same time there lived some birds with true teeth. So we have flying birds with teeth, and flying reptiles without teeth, but with bird-like beaks. It is hard to tell whether some forms are reptile-like birds or bird-like reptiles.

But our "Bushel of old Bones" has kept us long enough. The "Reptilian Age" passed away, and gave place to the Age of Mammals, during the last part of which the *Mastodon* took the place of the *Hadrosaur* in the Jersey forest.

Frederick Starr.

THE MERCENARY GARDENER.

TWITTER of birds,
Hum of bees,
A taste of spinach
And green pease.

Birds build nests,
Bees make honey,
Spinach and pease
Turn into money.

Adelle Thomson.

WHAT WINS.

THE world has full many a hero:
Go read what those heroes have done,
And you'll find that though oft they were baffled
They kept up their courage, and won.
They never lost courage in failure,
Giving up, as the weak-hearted will,
But said, "We will try and keep trying,
And conquer all obstacles still."

And this they have done, the world over.
Their tasks were accomplished at last
By often-repeated endeavor.
The young oak may bend to the blast,

But it springs to its place when it passes,
And grows to new strength every day,
And in time it stands firm in the tempest
Whose wrath whirls the tall pine away.

Defeat makes a man more persistent
If the right kind of courage is his;
He determines to conquer, and does it,
And this is what heroism is.
Strive on with a patient endeavor:
The steadfast of purpose will win.
Defeat comes to-day, but to-morrow
May usher the grand triumph in.

Eben E. Rexford.

CONFLICT BETWEEN CROSS AND CRESCENT IN THE CRUSADES, 1096-1187.

(Search-Questions in Mahometan History.)

101. What journey was considered in the Middle Ages an important Christian duty and what influence had this fact in establishing the crusades?

102. Who first preached the necessity of a crusade?

103. What pope at a great ecclesiastical council in 1095 urged the same thing?

104. How was the matter regarded by Europe in general?

105. Who led the first crusade, and when did it set forth from France?

106. What city, defended by the Seljouk Turks, was first captured by the crusaders?

107. What important city called "The Queen of the East," was taken from the Moslems in 1098?

108. When was Jerusalem taken by the Christians, and what was done to the Saracen inhabitants?

109. Who was the first king of Jerusalem?

110. What king of Jerusalem while carrying on a war with the Fatimites of Egypt died in that country?

111. What city in Mesopotamia, the seat of a Christian principality, was taken from the descendants of the crusaders by the Turks in 1145? What is the city now called?

112. What effect had this disaster upon the Christian world?

113. In what undertaking did Bernard of Clairvaux now engage?

114. What important Moslem city did the Christians besiege in the second crusade and fail to capture?

115. What king of Jerusalem joined with the Fatimites of Egypt in besieging a Turkish general in Pelusium?

116. What was the color of the Fatimite emblems, and with what color was it replaced by Saladin when the reign of the Fatimites in Egypt was extinguished?

117. What immediate effect had the extinction of the Fatimite dynasty upon the fortunes of the Eastern Christians?

118. Who was the last king of Jerusalem in the twelfth century?

119. What was the result of the battle of Tiberias?

120. When did Jerusalem surrender to Saladin, and how did he treat the inhabitants?

ANSWERS TO MARCH SEARCH-QUESTIONS.

61. Abu Bekr, whose caliphate lasted two years and three months.

62. That of Moseilama, one of the three false prophets that arose during the lifetime of Mahomet.

63. The Persian province of Chaldea was the first point of attack beyond the limits of Arabia.

64. The Roman army under Theodoric, the brother of Heraclius.

65. Omar, who reigned ten years and a half.

66. Damascus.

67. At the close of 636.

68. Alexandria.

69. The royal city of Rei, the ruins of which still remain a few miles from Teherân.

70. Othman's caliphate lasted twelve years.

71. To the Omeiad family.

72. Cyprus.

73. In conspiracy against him which ended in his assassination. At the moment when the assassins broke into his presence he was reading the Korân and as he fell beneath their swords he gathered up the leaves of the book and pressed them to his heart.

74. Ali was the son-in-law of Mahomet.

75. The "Battle of the Camel" was fought on the outskirts of Bussorah between the forces of Ali and the army of Bussorah which had rebelled against the caliph. In this battle the fiercest strife occurred about the camel of Ayesha, one of the wives of Mahomet, who was seated in her litter upon it.

76. Ali and Muâvia whom the Syrian rebels had chosen as their caliph.

77. The Kharejites.

78. They planned the assassination of the rival caliphs and of Amru, in their opinion the most probable successor of these two. Amru escaped, Muâvia was wounded and Ali was killed.

79. Hasân, the son of Ali, who in less than six months abdicated in favor of Muâvia.

80. The battle of the Zab in the year of the Hegira 132; in our era 750.

Oscar Fay Adams.



GERANIUM BLOSSOMS.

C. Y. F. R. U.

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WIDE AWAKE

VOLUME CC



BOSTON
D LOTHROP COMPANY

WASHINGTON STREET OPPOSITE BROMFIELD



SOUPS AND STEWS.

(Cooking in the Public Schools.)

IN talking with the English-trained teacher of one of the cooking schools, she said that very early in her American experience she was struck with the absence of soup from the tables of the ordinary American family.

"It seems to me," she said, "that here in America you regard soup as a luxury, and leave it entirely to the rich people, putting out of sight the fact that it is one of the most nourishing and least expensive forms of food. Now can you tell me why it is?"

I told her what I really thought, what I have found indeed to be the fact: that people do not at all regard it from any economical standpoint; that they have grown to think the making of soup involves a deal of labor — which is quite a mistaken notion, as our white-capped and aproned girls quickly learn. To be sure there is a little more work in making a soup than in leaving it unmade; but it is one of the things that pay for themselves, and after all, the dread of it is much greater than the doing.

But a prominent feature of the School-Kitchen work is the preparation of soups, both with and without stock, and the cooking of savory stews. And how good they both are, when one comes home with a keen appetite after a morning at school! The odor is enough to make a hungry boy or girl hungrier than ever. There is nothing I like better than going to the school when I know they are learning in this special line of cookery.

Let us go together to-day to Tennyson street, and take the lesson in soup and stew-making. Caps and aprons are on, the "cutting boards" are taken out from under desks and tables and laid upon them, and knives are examined to see if they are sharp. The "cutting board"

is a small board that is like a bread-board in miniature, and is used to cut meat upon, thus protecting the work-table. You will find that it is much easier to wash a small board like that, than to have your whole table to scour. These little economies of time and labor are among the most valuable of the things that are taught in the School Kitchen — just ask your mother if they are not; she has probably learned their worth by this time.

Now comes the explanation of the difference between a soup and a stew. In the first, the object is to extract all the goodness and the nourishing qualities from the meat, and having seasoned this extract properly to serve it in its liquid form. The simple, plain extract of the meat, when it is prepared, is called "stock," and it serves as a basis for several kinds of soup. For instance: if you add to your head-stock bits of macaroni that have been boiled in salted water, then cut into short pieces, you have a macaroni soup; if you add carrot, turnip and other vegetables cut in small dice or fanciful designs, you have a Julienne soup; if you add barley you have "barley soup;" if you clear the stock and serve it plain you have a consommé. But in them all the stock or basis is the same.

You will see from the pieces of meat that the teacher places before you, that she has not selected the finest and the most expensive cuts, but that she has taken the coarser, heavier parts, with a good deal of bone. Listen, and she will tell you why.

"These pieces," she says, "are not available for roasting or broiling, yet they are full of nutriment, and are more strengthening than the finer cuts. We must use them in some way; it will not do to throw away the best part of the

beef. So we extract the nourishment and make it into a soup. The way to get all the strength from the meat is to put it—after cutting it into small pieces and cracking the bones—into a kettle and cover it with cold water; letting it stand a little while on the back of the stove or range, then bringing it forward where it will heat very slowly.

What you will want for the stock is the following list of ingredients: Two pounds of the hind-shin of beef, two quarts of salt water, six whole cloves, six peppercorns, one bunch of sweet-herbs, one blade of mace not more than an inch long, two teaspoonfuls of salt, one small onion, half of a small carrot, half of a small turnip, one sprig of parsley. The herbs are sage, savory, marjoram, thyme and bay. If you are buying them for yourself, buy the whole herbs, dried, and not the sifted ones put into boxes. You don't know exactly what you are getting in these boxes, but you may feel pretty sure that it is something beside what you are paying for. If you are where you can have a bit of ground, just have your own herb-bed. But I shall have something more to say about that another time, so I won't stop for anything but the suggestion now.

The ingredients are together now, and the real work begins. Wipe the meat carefully and cut it in small pieces, break the bone, and put meat, bones and marrow into the soup kettle; cover with the cold water and let it soak for half an hour or so, while you are preparing the vegetables. Stick the cloves into the onion, put a tablespoonful of butter or clear beef dripping into a sauce pan and set it over the gas stove; brown the onion in this, being very careful not to burn it; cut the carrot and turnip fine; then add them, the browned onion, the spices and herbs, to the meat and water. You will let this simmer if possible for five or six hours. Perhaps some one says that the session of the school will not be long enough to allow of giving this time to it. I will tell you how they manage in the School Kitchen. The class that comes in the morning prepares the soup and puts it over to cook, and it is finished by the class which comes in the afternoon. The lessons are repeated the next week when the classes are changed, so that the afternoon class gets the morning lessons of the week before, and the morning class in its

turn gets the afternoon lessons, so that each class has the entire process of soup-making.

When the soup is sufficiently cooked, strain it through a fine strainer, over which you have laid a piece of strainer-cloth. Then, if you have time, set it aside to cool. When you wish to use it, take off the hard cake of fat which has formed on the top, and you will find beneath a thick, rich jelly, which is the stock or basis of any soup in the list of brown soups you may choose to make.

I have already told you how by using different materials with this stock you may vary your soup. I will now give you one or two rules for special soups taught at the school.

Take first rice soup, which is a great favorite. To make this, you will use the materials in the following proportions: to every cup of stock allow one half tablespoonful of rice and one salt-spoonful of salt; cook the rice in boiling salted water for half an hour, or until it is tender, then drain it and add it to the boiling stock.

For the mixed vegetable or (as it is called on hotel bills-of-fare) Julienne soup: to every cup of stock one tablespoonful each of carrot and turnip, and the usual saltspoonful of salt; wash and scrape the carrot, pare the turnip, and cut them both into tiny dice about a quarter of an inch square, put them into boiling salted water and cook them until they are tender, drain them, and add them to the boiling stock to which the salt has been previously added. It probably is unnecessary to tell you that all soups should be served hot—nothing is more depressing to the stomach or mind than half-chilled soup.

Now a word about soups without stock; these are made from vegetables, enriched by the addition of butter, milk and cream, and savory by the judicious addition of seasonings. Indeed one of the first things you will be taught in the School Kitchen, is the value of herbs and spices as related to food. If any one were to ask me the secret of good cooking, I should say "seasoning first, seasoning last, and seasoning all the time." It is this that makes food palatable and enjoyable.

The simplest of these soups without stock, as well as one of the most nourishing, is the potato soup; it is also inexpensive and easily prepared. The proportions and ingredients are as follows:

for every three potatoes use one pint of milk, or if milk is not easily obtainable and you are obliged to be sparing of it, you may use one half pint of milk and one half pint of water; one tablespoonful of chopped onion, one teaspoonful of salt, a speck of white pepper—you will find out how much “a speck” is by referring back to your table of measurements that was given in one of the earlier chapters—one half tablespoonful of flour, one half tablespoonful of dripping or butter; unless the butter is very good use clear beef dripping in preference. So much for the ingredients; now for the soup. Wash and pare the potatoes and cook them in boiling water until they are soft; while the potatoes are cooking put the milk over in the double-boiler with the onion. When the potatoes are done drain and mash them, add the boiling milk and the seasoning, rub them through a strainer, put them back in the double-boiler to boil again. Then melt the dripping in a small saucepan, add the flour, stirring it constantly as it thickens. When the flour is well cooked, which will be in three or four minutes, add it to the boiling soup, stirring it well in; letting it boil five minutes, add one tablespoonful of finely chopped parsley and serve it hot, with croûtons which you learned to make in the chapter on baking.

I have given so much time to soups that I am afraid I cannot say as much as I would like about stews, but I will have time to tell you enough so that you, like the girls in the School Kitchen, may dare to try to make a simple stew at home.

In a soup all the nutriment of the meat is extracted, and it is served in the liquid form; in making stews the goodness of the meat is to be preserved, while a portion of the nutriment is to go into the sauce or gravy; less water is used than in making soup and it is cooked at a moderate heat for a long time. The pieces of meat best adapted for stewing are the pieces from the upper part of the shin, the aitch bone, the flank and the shoulder; it is better to use meat that has some fat and bone, as the stew will be richer.

You will be surprised to find under how many fanciful names the homely stew masquerades. We all know the plain Irish stew with its vege-

tables and dumplings cooked with the meat; I dare say many of you have often wondered, as I used to do when a little girl, while puzzling over the queer names in the cookery books, what a ragout might be. Well, it is nothing more or less than our friend, the stew, highly flavored with wine. A salmi is a stew of game, usually made from the left-over pieces of a game dinner; this is also quite highly flavored, oftenest with currant jelly. A haricot is a stew with the meat and vegetables cut fine. Of course you all know that a chowder is a stew of fish, clams or oysters; and that a fricassee is a stew



PARSLEY AND THYME.

in which the meat is browned in fat, either before or after cooking in the hot water, and is served without vegetables. A pot-pie is a stew in which the dough is put on as a crust, covering the whole top of the kettle in which it is cooked instead of being used in balls as dumplings.

The vegetables that are principally used with stews are onions, potatoes, carrots and turnips; these should be cut small and added to the stew about half an hour before it is to be served.

While the vegetables are boiling the kettle should be drawn toward the front of the stove, so that the water will more than simmer. If you have used the bones and fat in the preparation of the stew, you should remove them before adding the vegetables. (Dumplings will be taught in the next lesson, which will be on "batters.")

Now for one simple stew, one called in the Liverpool School, an "Exeter Stew." Use for every half pound of beef, half of an onion, one quarter each of turnip and carrot, two potatoes, salt and pepper to taste, a little flour, and water enough to cover. Wipe the meat, cut it into small pieces, removing any bits of crumbly bone that may adhere to it. Put the larger bones into a kettle and cover with cold water, melt the fat of the meat, brown the sliced onion in it and skim them out as soon as they are a fine yellow brown; dredge the bits of meat with flour, sprinkle them with salt and pepper and brown them

in the onion-seasoned fat. Put them and the onions into the kettle in which the bone is boiling and add enough boiling water to cover. Simmer from two to three hours, or until the meat is tender; half an hour before serving add the other vegetables, which should have been cut in small dice; twenty minutes before serving add the potatoes, which have been washed and pared and cut into quarters, and parboiled five minutes. You should take out the fat and bone before adding the vegetables. When ready to serve, skim out the meat and potatoes upon a hot platter, thicken the gravy if you think it necessary, add seasoning, then pour it over the meat. Half a cup of stewed tomato, that has been strained, is an excellent addition. If you make this stew successfully you will no doubt eat it with as keen a relish as did the girls in School Kitchen No. 1 on the memorable day when they and I learned how to make an "Exeter Stew."

Sallie Joy White.

KIT T A T I N N Y.

(Geological Talks.)

WHEN I was a Senior at college I one day took a long walk with two Lower classmen. They were young fellows not accustomed to long trips on foot and they thought they wanted to walk from Easton to the Delaware Water Gap—a distance of twenty-five miles. They knew that I had made the trip and so came to me for direction as to the route. Having tried in vain to turn them from the enterprise I at last said that I would go with them.

We started early in the morning and I took the lead so as to "keep them up to time." For a few miles they went very well. We took the "river road" along the Delaware, through the Wygate, where the river breaks through Chestnut Hill, by a really beautiful gap. Here we passed through Schemertown, a miserable little fishing village wedged between the cliff and the river. Beyond this we came out into a good farming district and still keeping to the river

passed through Mineral Springs, Sandt's Eddy and Howelltown. There was just enough of river and hill to give pretty views at all times. Beyond Howelltown we reach the mouth of Martin's Creek and the road strikes back from the river into the hill country. Passing near Martin's Creek village, we cross the Creek proper and begin to climb "Three Church Hill."

From here we look out over the country and see my pet "Blue Mountain" clearly against the sky. A long ridge, deep-blue, straight-topped, but jagged or broken at points by several gaps, it stands sharply defined though still some miles away. To the right end of the ridge is the great Delaware Water Gap, nearly fifteen miles away, cleaving the ridge to its very base. Then to the left is the "Wind Gap," smooth-cut, bowl-shaped, scooped out from the crest. Then comes the "Little Gap," from here just a

dip in the line, and far to the left is "Lehigh Gap," a "V" through which the "Lehigh River" twists and coils its way southward. This last Gap is perhaps nearly twenty-five miles distant. It is a beautiful scene. This straight-topped ridge of blue fifteen hundred feet high, is fifteen hundred miles long, reaching from New England to Alabama in one great stretch, broken only by such gaps or cuts as we see here. This is not the only point from which this view can be seen. At the Wygate summit of Chestnut Hill and from Mammy Morgan's Hill south of Easton, it is just the same, though those points are much further away than this outlook.

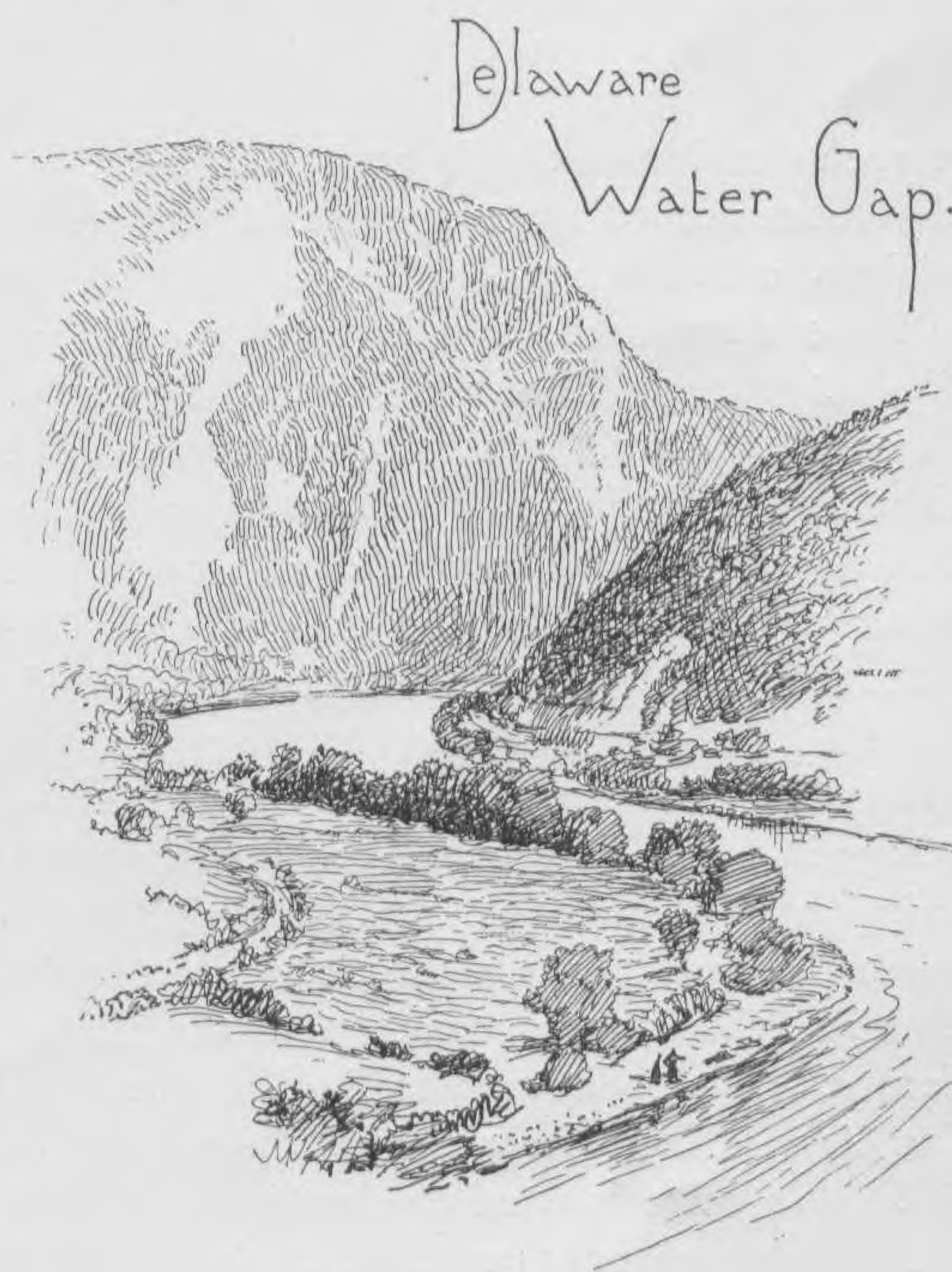
We went on from here and I could see that my Freshmen were beginning to tire. Through Richmond next and then uphill and down, sometimes seeing the Blue Mountain and sometimes not, through Williamsburg at last to Portland. Here we meet the river again, and stand face to face with the mountain, now gray and rugged. It is only noon; twenty miles have been made, the boys are tired, so I let them take their own gait and it takes three hours to make the next five miles!

As we leave Portland we get details of the Gap. Mount Minsi towers up on this side of the river almost straight from the water's edge. New Jersey Mountain—more rough and rugged and massive, wilder in its whole effect—rises from the other shore. Old Blockade Mountain (or Blockhead) blocks the background so that we do not see clearly and squarely through. The mountain is only three miles away. A mile and a half and we come to Slateford, once a busy little settlement but now quiet, deserted by the world, dead. Close by is a pretty glen; and here, just beyond, we enter the Gap.

It is grand and beautiful. The rough rock walls rise fifteen hundred feet on either side; delicate ferns nestle in the cracks and crevices of the rock, gray lichens cover the rough-tumbled blocks of stone; trees cling to the precipice side, though it seems as if there were no foothold for them. The river here is dark and deep. Yet there is no sadness in the scene, but a quiet, solemn beauty. For two miles we walk through this gorge, turning with the river around Blockade Mountain and at last reach the station. My poor Freshmen are tired out. One,

in fact, has been lifting his legs with his hands for the last mile! They sit down in the station and try to rest. In vain I suggest that we climb Mount Minsi to the summit—for it is only two miles and a half as the path runs. They are heartily glad when the train comes to take us home!

But for me that walk was no new experience. It had been taken many times. That "Blue Mountain" was more to me than any other bit of scenery I know of. Its quiet strength, its proportions, its regularity, the gashes that rivers had cut into it, the immense length—all these were to me so many charms. It is "my moun-



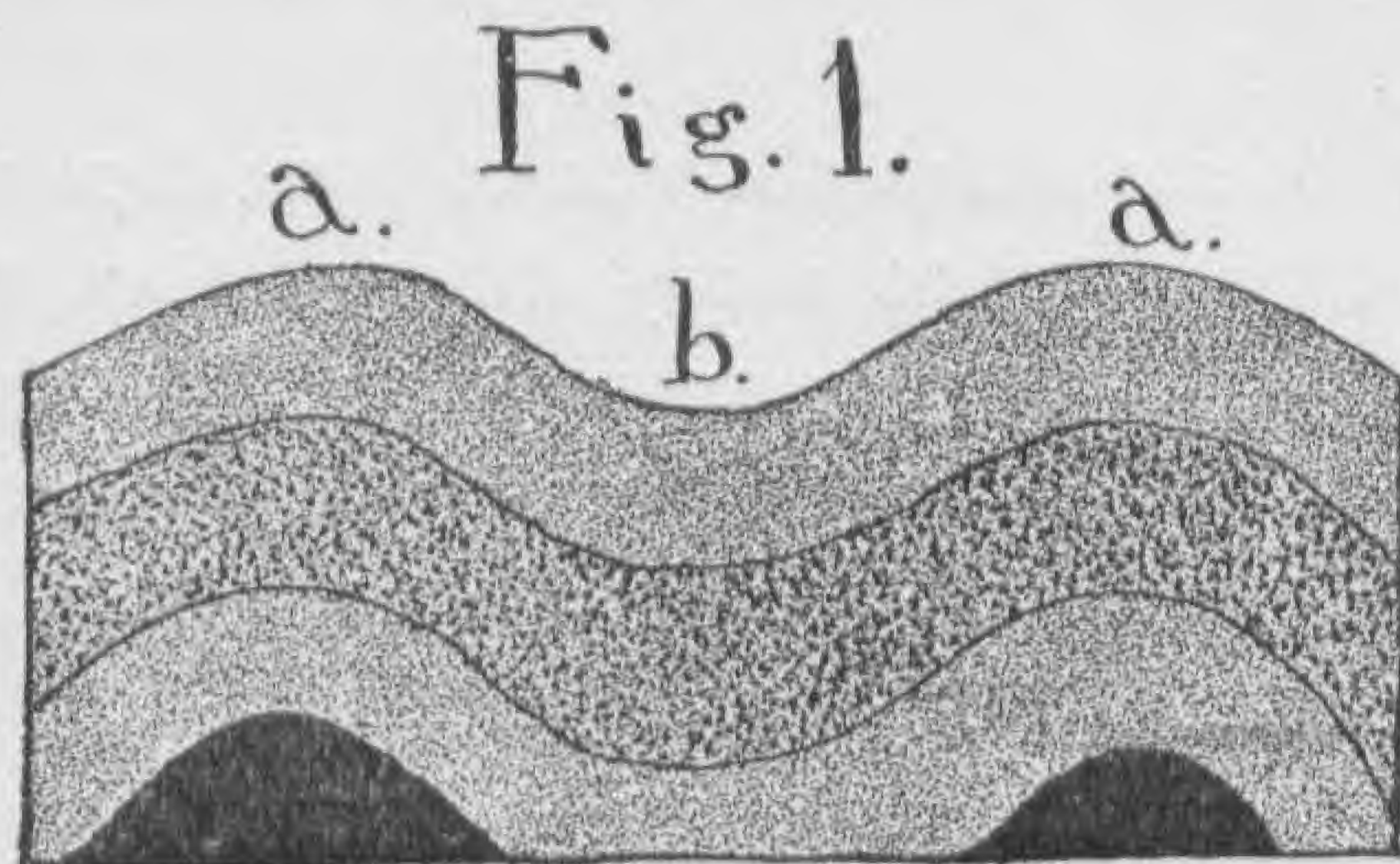
VIEW OF WINONA CLIFF, WATER GAP, PA.

tain." Fifteen hundred miles as one great ridge, from Massachusetts to Alabama—no wonder the Indians called it "Kittatinny, the endless hills." As long as our "long line of hills," but so different. Hard rock this. No glacier formed it. Its present form is due to the "tooth of time"—but what made it?

Let us try to find out something about the making of mountains. It is a difficult subject. The wise men are not agreed upon the details. We will consider three points. First, How are

mountains made? Second, What types of mountains are there? Third, The Ages of North American Mountains.

To understand these three subjects we must know two other things. In order to speak of



TWO ANTICLINAL RIDGES (*a a*), AND A SYNCLINAL VALLEY (*b*).

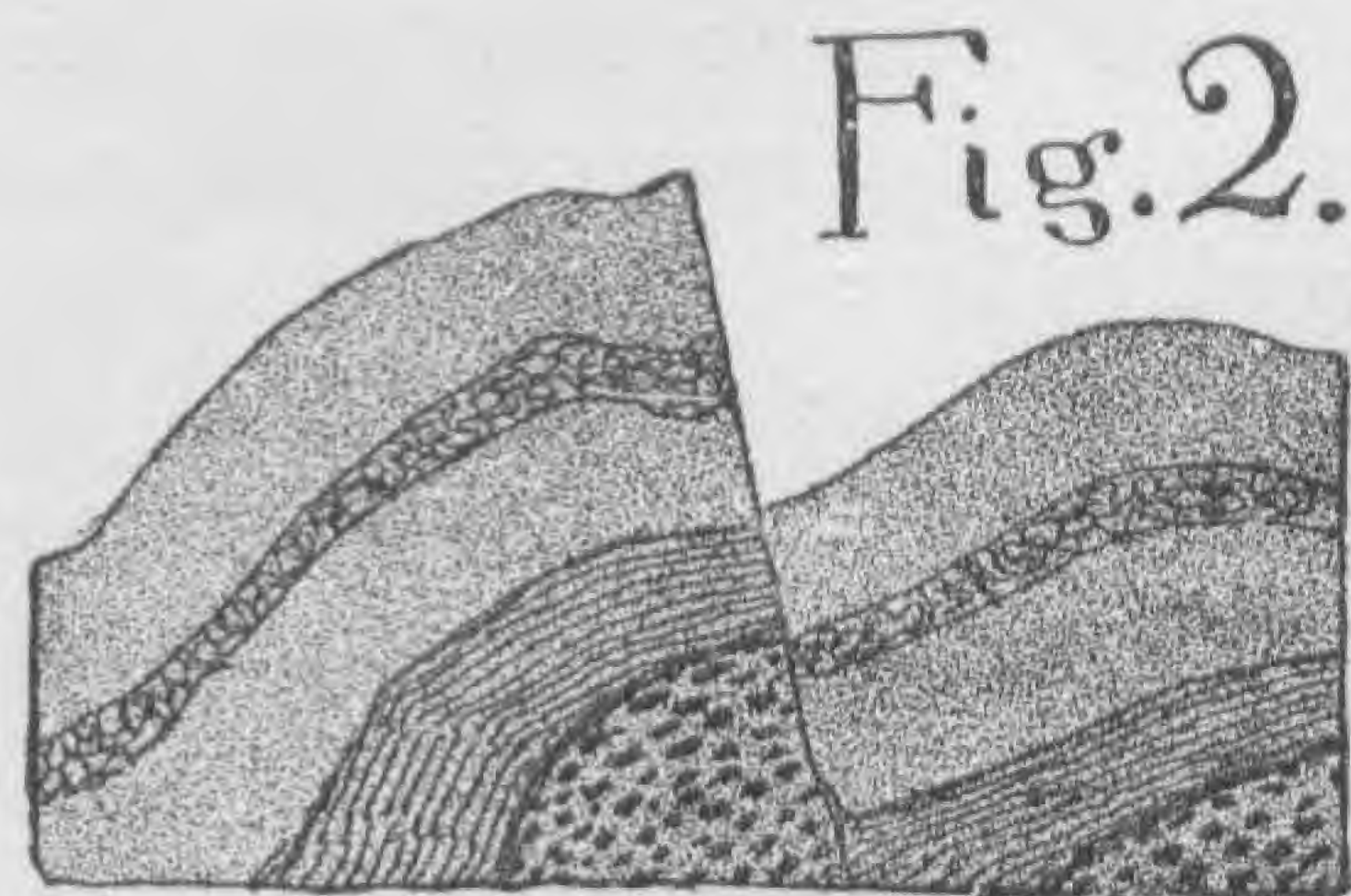
the rocks understandingly geologists have divided them according to age into a number of divisions called "Ages." These Ages as we shall use them are seven in number, and are called Archæan, Silurian, Devonian, Carboniferous, Reptilian, Tertiary, Quaternary. The oldest is the Archæan. We are living in the Quaternary. The Glacial Period was in the Quaternary as was also the time of the Mastodon. These Ages are long, many thousands of years in each. All however are not of the same length; the Archæan is far the longest—perhaps it was as long as all the rest together. During the Silurian Age our "Odd Fish" began to come in, and they were most abundant in the Devonian, though also common in the Carboniferous. The great reptiles lived in the Reptilian Age. Keep the order of these Ages in mind. We have located the subjects already studied and can now understand what is later said in regard to the Ages of different mountains.

Next it is believed that the earth was once an intensely hot mass of gas. This mass became cooler, and as it cooled it shrank. Then, in time, it became a ball of molten liquid matter. Still later, with cooling, this ball began to crust over—and still it continually grew smaller and smaller. A thing that is cooling is also contracting usually, and the earth is no exception to this rule.

We are now ready for our three questions concerning mountains. How were they made?

We shall only sketch the general method. If the earth were a cooling, shrinking, liquid ball, a time must come when a crust of solid matter will form, as we saw above. The interior however would still remain hot and molten. As this continues to cool and contract, the crust is subjected to great pressures within itself. The result finally will be that along some line, where there is weakness, there will be a bending and folding of the rocks up into great curves or arches, long ridges with valleys between. You would scarcely think that solid hard rocks could be bent into curves, would you? Yet it is so. If the pressure tending to bend the rock acts very slowly the result is certain. You remember how slowly such movements may take place—how slowly the Pacific bottom sank, when coral islands were forming—how slowly some Western mountains have risen against the course of a river? Such slow movements as these are the result of pressures within the earth's crust, and such slow acting movements—only a few feet a century—may take solid rocks, in horizontal beds, and twist them and bend them into great curves and folds (*Fig. 1*).

Sometimes there will be breaks and slips—these are called "faults." Where will there be a "line of weakness" in the crust, and why? It is generally where great quantities of sediment are carried down by rivers and dumped into the sea. This is laid down in beds, which thicken with each season of flood. In such regions of much sediment deposit the sea-bottom

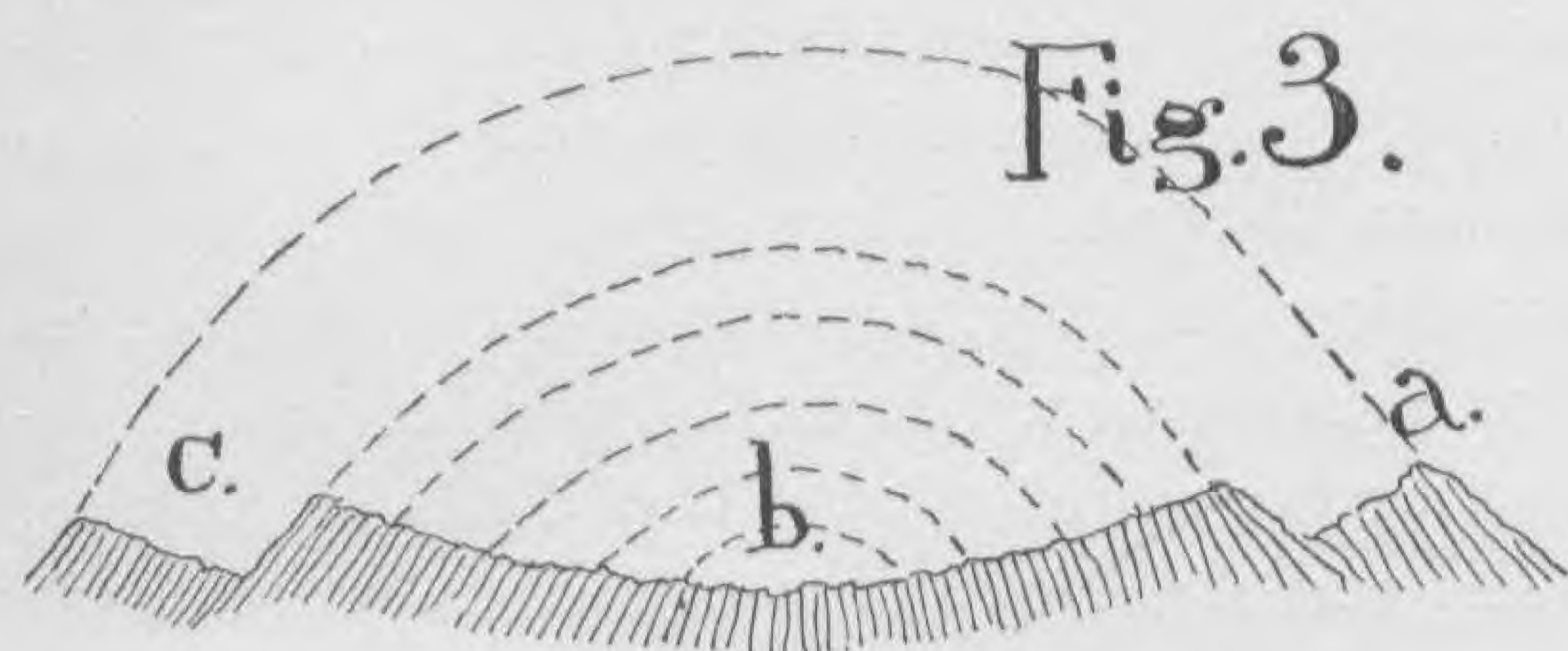


A MONOCLINAL MOUNTAIN PRODUCED BY A FAULT.

is usually sinking toward the earth's center. As this sinks the under part of the crust is softened and heated and even melted off. As a result we have a thinned piece of the older crust supporting a great mass of newly-formed rock. Upon this "line of weakness" pressures begin

to act from both sides and the mass is pressed up, crushed together, mashed and slipped, until it rises along a certain direction, at right angles to the main pressure, into a ridge or a series of parallel ridges and a new mountain range or chain is formed.

In order to make such a mountain range we need a basin into which sediment is being



SECTION ACROSS NITTANY VALLEY.

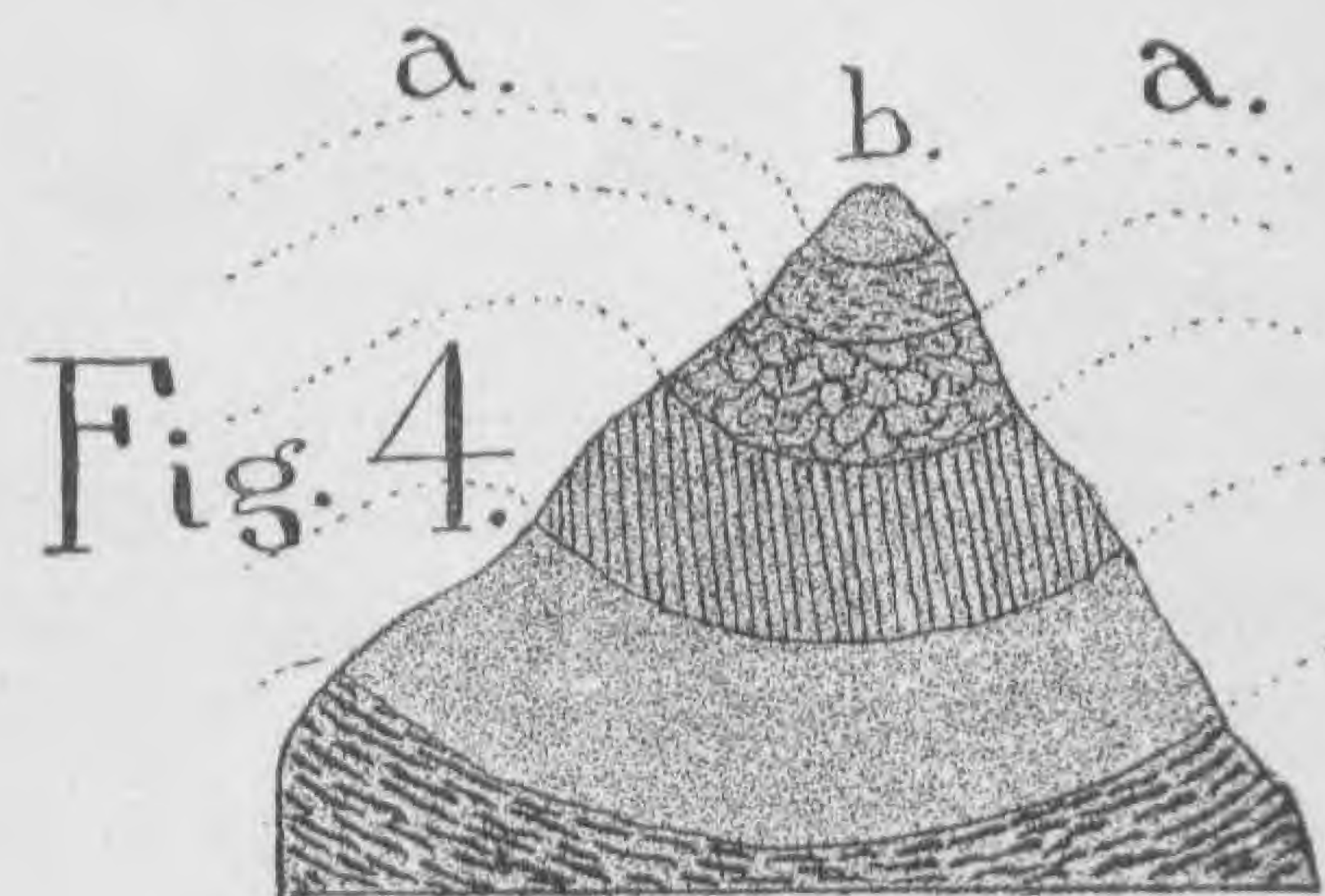
(a. Bald Eagle Mountain. b. Nittany Valley. c. Nittany Mountains. Dotted lines show old anticlinal removed by erosion.)

poured. To illustrate: in the making of the Appalachians, a basin stretching from New York to Alabama, which, Dana says, was one hundred or two hundred miles wide, was filled with a mass of sediment forty thousand feet thick. So much erosion and sedimentation would require a long time. While this great mass of sediment was being deposited the trough was doubtless slowly sinking. Then came the weakening of the crust beneath, the accumulation of pressures from both sides over this point, the arching and folding and faulting of this sedimentary mass — and the Appalachians were made.

I have thus sketched rapidly and very imperfectly the common method of mountain-making. As the result of such forces certain types of mountains would be produced. This is our second point: kinds of mountains. First then, we may have a mountain range consisting of a single upward fold. The rocks would dip away on both sides from the summit. (Fig. 1, a.) Such a mountain is called an "anticlinal" (inclining in both directions). Between the ranges would be a "synclinal" valley (Fig. 1, b.) where the rocks dip toward each other. Some of the Rocky Mountains are "anticlinal." We may find also a mountain where the fold, in making, had broken, one side slipping over the other. This would give us a fault mountain, a "monoclinical," as all the layers dip in only one direc-

tion. (Fig. 2.) But these are not the only types of mountains, nor are all valleys synclinal. These are the simplest original forms. The tooth of time, acting on such forms as these, gnaws at them until they are completely changed. A "synclinal mountain," or an "anticlinal valley," may result, or monoclinical mountains may be left.

To illustrate the carving and cutting done in this way, let us look at the Nittany Valley in Pennsylvania and its bounding mountains. I do not claim that this diagram is accurate. It is only a rough sketch of the conditions as I remember them; (a) is old Bald Eagle Mountain with its rock layers all dipping in one direction, as shown in the figure. Just back of it is a similar ridge. Then comes the beautiful Nittany Valley, perhaps two or three miles across. On the other side of this lies Nittany Mountains, double-ridged; all these ridges lie parallel. Examining the rocks of the valley we find those on one side dipping in one direction, those on the other side in the other direction. Nittany Mountain rocks dip opposite to those of Bald Eagle. So here we have four monoclinical ridges and an anticlinal valley, all as the result of erosion. Do you not see that this whole region was once an anticlinal ridge, a mountain which, I think, Lesley says, was once thirty thousand feet high? It has however been worn away so that only ridges of hard rock are left. Four monoclinical mountains fifteen hundred feet high and a wide and beautiful anticlinal valley are all



SYNCLINAL MOUNTAIN.

(Produced by erosion out of two (a a) anticlinals with synclinal valley (b) between.)

that is left of a mountain, and higher than any now known.

We may even get a "synclinal" mountain by erosion. (Fig. 4.) Here is one. Originally

there were produced, by the mountain-making force, two crests with a synclinal valley between them. Erosion has worn away the heights and left what was the bottom of the valley as a peak. Nor is it strange that anticlinal peaks should be worn away while the valley rock should be left. In any series of folded rocks the material would probably be folded and pressed tighter, closer and harder in the valley than in the crest. Also on the crest the tendency is for cracks and crevices to be opened by the pressure raising the crest. So erosion would find easier work there on account of fissures and softer rock than in the valleys. There are other types of mountains, partly the result of folding, partly of erosion, which we will not mention.

There is however one other kind of mountain that is peculiar which we may mention, that you may have the main kinds together. It is not due to folding at all. Sometimes erosion cuts deep gullies into horizontal-bedded rocks in such a way as to leave great massive mountains standing alone. Such are the Catskills of New York.

Lastly as to the Age of our American mountains. In mountain-making there is usually a long period of quiet subsidence and accumulation of sediment, and then the time of raising up of this vast mass into the mountain range. Hence there are definite mountain-making times in the world's history. The oldest mountains in North America are the Laurentian Mountains in Canada and the Adirondacks in New York. The southern part of our Blue Ridge was perhaps made at the same time, and some few Western mountains. These were raised before the Silurian Age and were of course much higher than now, as they have suffered the wear of all the ages since, and remain only as fragments of what they once were. The Green Mountains of Vermont were brought up during the Silurian Age, though they afterwards gained in height. The bulk of the great Appalachian System was not in existence yet, though perhaps the northern part of the Blue Ridge was made at this time. In the Rocky Mountain district there

were none of the present mountains formed except as rocky islet-peaks here and there. When I say present mountains, I mean to suggest that the first mountains have disappeared, worn away, lost. Our present mountains are made up of the material from those lost heights.

Just as the Carboniferous Age was ending came on one of the greatest mountain-making times of history. For three long ages old-time mountains had been wearing out into a trough-shaped basin located where now is the Appalachian System. Then came into play the shrinking, yielding, and elevation that gave us that great group. It was a time of mountain-making the world over. The Urals in Europe, Asia, and the mountains of Britain were made then. During the Reptilian Age, perhaps a little before the time of the great winged reptiles in Kansas, great mountain-making activity was shown in the West, and the Sierra Nevada and other ranges in that region were made. There was very little action in the East at that time, though a few ridges rose between the Appalachians and the Atlantic—one of which presents us with "The Palisades of the Hudson." The great center of mountain-making seemed shifted now to the West and in the Tertiary, the Walesatch and Coast ranges—one east, the other west, of the Sierra Nevada—were raised. Then too the Rocky Mountain System as a whole received its full development. We see that it grew by stages; from islets in the Silurian to its full force in the Tertiary. While this great activity in our Western country was in progress many of the great mountains of the globe were formed—the Pyrenees, Alps and Himalyas in the Old World, and the Andes in the New.

When now we take our last look at Kittatinny, with its straight blue crest clear against the sky, and its deep gashed or bowl-scooped gaps, let us remember its history—the long gathering of its material in a deep trough, the yielding, the folding, the raising and the later erosion, and we see that the mountains too have a story.

Frederick Starr.

VOLUNTEER READINGS IN SCHOOL.

(Ways To Do Things.)

NOT many weeks since I was called on business to Chauncy Hall School in Boston. I wanted particularly to see Mr. Ladd, the Principal, and sending in my name, I was told by the polite boy-messenger that Mr. Ladd was engaged with a reading-class and that I was to come to the recitation-room. As I entered I was greeted by a smile from an assembled class of boys and girls, while Principal Ladd gave a more than usually cordial welcome. The children were seated about the room evidently as pleased themselves, and with no attempt at special class-arrangement. At the back of the room stood a boy with an open copy of *WIDE AWAKE* in his hand, from which he had been reading when my entrance interrupted him.

"Go on, Spargo," said Mr. Ladd, as I seated myself by his side. So Spargo did go on, and I was very much surprised to hear him read from my own account of the blind children reading "Five Little Peppers." That was the reason that the children smiled so knowingly as I entered, and Mr. Ladd gave me so marked a welcome.

It is not particularly to tell this that I am writing the article, but it has occurred to me that some young teachers may like to know something concerning the methods in this famous school, particularly the manner in which general reading is taught, and the very pleasant way in which the children are led up to an appreciation of the spirit of literature; also that boys and girls may like to suggest trying the plan to their teachers—at any event it seems to me worth the telling, since it differs so much from the methods employed in most schools concerning which I know much about.

One of the features of this method is the Friday "volunteer reading," as it is called, of the lower classes in the school. The children are allowed to bring something of their own selection to read in class on Friday. On this day the Principal takes these classes himself, and he says he enjoys them more than he does

any work of the week. The children are to make their own selections, the only thing required being that they shall read the pieces over to some older person at home, and look out words they do not know the meaning of, so that they may read understandingly.

This lesson is not an exercise in elocution, as reading-lessons are made in so many schools. It is a mental work, training the understanding, and guiding the taste. To the children it seems so little like an enforced task that they regard it, almost, as a diversion. But their gain in this weekly three quarters of an hour is great.

I had known about this phase of work for a long time. Indeed I had been audience to single members of the classes during the school-year for three years, as one after the other of the pupils I was specially interested in took part in the "volunteer reading," and I had watched the developing of taste and the interest in certain writers; but, strange as it may seem, I had never been into a class until I stumbled into it by the mere accident that Friday not so very long ago.

The selections to which I listened that day were as varied as the taste of the seventeen or eighteen eleven-year-old readers could make them. They included prose and poetry, natural history and science, narrative, description and humor. One boy read an amusing paragraph from a newspaper, that gave him an opportunity of showing his powers of imitation, and gave the others the opportunity they all coveted—that of having a good laugh in school-hours. Another read something about the habits of the tiger; still another had selected the description of a steam-engine, and on being questioned showed himself an enthusiastic lover of mechanics. One of the selections was Mrs. Hemans' poem, "The Landing of the Pilgrims," and from that the children had a history lesson of more than usual interest. If you can believe it, there were children who did not know where Plymouth was; that is, they knew

it was on the coast somewhere, and there was a general opinion in favor of Massachusetts, although some thought it might be in Virginia. But there were those in the class who had been there, and had seen for themselves the quaint old town on the hill that slopes down to the water, and knew that it was the first abiding-place of the Pilgrims who wandered here in their search for a new home. These pupils had many interesting things to tell, and were encouraged to tell them, and when at the end of the hour the teacher asked if they had learned anything new, the shout that went up the most generally was: "Yes, we know now all about Plymouth!" There was a little bright, round-cheeked girl from far-away Honolulu in the class, and she got very much interested over this bit of history; it was like an Arabian Nights tale to her. One of the girls had taken as a selection one of Lockhart's ringing Spanish ballads, while another had chosen a religious hymn, and another a bit of lyric description. I am sorry to say that some had chosen very carelessly, and had not read the pieces at all before coming to class. I think, though, they had the grace to be ashamed of themselves when they contrasted their own poor performance with that of those who had selected with care and made a careful study of their pieces. When the author was one who was well-known the teacher would tell the children about him, and give them some idea of the place he held in literature. Then he would name one or two standard writers and suggest that the children should try and find something they had written. This was not given as a task that must be done, but was thrown out as a suggestion, and some of the children were sure to seize upon it and use it.

It may interest you to know some of the selections that have been brought by children in the past. You must remember, in order to give proper value to their taste in selections, that the children who made them are in the two lower classes of the grammar department, and their ages average from nine to twelve years. On the list that I have, are Wordsworth's "Daffodils"; Mrs. Browning's "Swan's Nest"; Goldsmith's "Deserted Village"; selections from Edmund Burke, Daniel Webster,

Milton, Shakespeare; "The Death of Paul Dombey," Holmes's "Grandmother's Story of Bunker Hill," "Old Ironsides," and "Dorothy Q."; bits from Longfellow's "Evangeline," and from Dickens' "Christmas Carol." This certainly shows how the children become familiar with the best work of the modern writers. The leading is so gradual, too, that the children themselves are not aware how much good it is doing them; they will understand it when they are older, and will be glad of the kind of training they got when they were such little children.

Quite in contrast with this method of teaching is one that obtains in another school where elocutionary effect is sought rather than intellectual appreciation. The story was told me by Mr. John J. Hayes, the accomplished teacher of reading at Harvard College. One day a young girl came to him to take some lessons in reading. She had been told that she had talent and would make her mark as an "elocutionist"—how I dislike that word! Mr. Hayes asked her to read something, and she undertook to recite a poem. She gave no meaning to the lines, but she had a great many gestures; she raised her eyes and her shoulders, and did a great many things that were supposably dramatic, but which were particularly inappropriate to the descriptive poem she was reciting. After she had finished Mr. Hayes said:

"What do you suppose was the poet's thought when he wrote this:

'O, Freedom! thou art not as poets dream,
A fair young girl, with light and delicate limbs;
A bearded man, armed to the teeth, art thou.'"

A blank look came into the girl's face. "I don't think I know what you mean."

"Why, what do you think the poet meant by those lines?"

"I don't know; I never learned that," was the hesitating reply.

"Yet you tell me you have studied it," said Mr. Hayes.

"Why, yes, I have spent a great deal of time on it, and my teacher marked it for me."

"Let me see it," and Mr. Hayes held out his hand for the book which was put into it with an air of the greatest assurance, as though it was to settle every question of her "study."

And what do you think the "notes" were? Simply these: "right hand extended," "weight forward on the left foot," "raise the eyes," "both hands in appeal," and so on. Not a suggestion about the expression, but all meaningless action. This is the way so many are taught who seem to consider elocution "so far ahead of reading."

The great danger has been, in this late craze, that the world would lose its readers in the flood of elocutionists that are being poured out of the hands of teachers of that terribly overworked "art." In former times it was considered a great accomplishment to read well; that is to read understandingly, behaving in the meantime like a lady or gentleman, and not like a spasmodic marionette whose wires are out of order, and only work by jerks. It is the reading with the understanding that is taught to the little folks I have been telling of, and it is a kind of teaching that will give its results all through a pupil's life.

It seems to me that this method is a good one for all teachers to follow. In place of the stereotyped reading lesson, from the book that

is in constant use, take a day occasionally from the routine, and let the children bring whatever they like for their reading exercise. At first they may disappoint the teacher in the selection, but a little judicious advice will be a great help. One thing may be set down as certain. Most children appreciate writing that seems far in advance of their comprehension. They catch the best spirit of an author, and retain it. This is particularly true of poetry. I have been very much surprised at the fancy quite young children will take to certain poems. It is not the jingle of the rhyme, or the smoothness of the rhythm. It is the something in the poem itself that appeals to a chord in the childish mind. Mrs. Browning said that when she was a little girl she "gathered visions from Plato."

In the reading exercises to which I have referred, the magazines play an important part, and the newspapers serve a good purpose. In this way the children keep up, to a certain extent, with the new literature of the day, and it is hard to find anything so new that it has not fallen under the quick eyes of some Chauncy Hall School boy or girl.

Sallie Joy White.

THE BLACK PRINCE'S RUBY.

(Stories about Famous Precious Stones.)

IN the middle of the fourteenth century Spain was ruled by a number of petty kings whose wars, assassinations and executions leave a general impression of bloodiness upon the mind by which all distinct detail is engulfed. It is essential however to remember that Granada was ruled by a Moorish prince, Mohammed by name, and Castile owned by Lord Don Pedro, the Cruel by title. The Moorish Mohammed, an easy-going personage, was dethroned by his brother-in-law Abu Said. Flying for his life, he escaped to Seville and threw himself upon the mercy of this Pedro the Cruel. This monarch espoused the cause of his kingly neighbor, and after several defeats the usurper thought it best

to come to Seville and arrange a peace with his foe. Abu Said accordingly repaired to the capital of Don Pedro accompanied by a numerous and most magnificent suite. He was politely received, but the next day, by Don Pedro's order, Abu Said and all his attendants were set upon and murdered. This was done for the sake of the Moorish prince's jewels which were many and valuable. Among the treasures thus evilly acquired was the Ruby now set in the crown of England.

Though enriched by this spoil, Don Pedro soon felt the instability of human greatness, and in his turn had to fly for his life. His adversary was his own brother, Henry, the son

of the beautiful and unfortunate Leonora de Guzman. This Henry raised a goodly army for himself composed for the most part of Gascon mercenaries, and he had for counselor and captain the famous French knight, Bertrand Duguesclin. Against such a foe Don Pedro could make no stand, so he hurried to Bordeaux, where the Black Prince along with his wife Joan, called the Fair Maid of Kent, was keeping his Christmas in right royal style. This was in 1366. Don Pedro promised untold treasures to the Black Prince if he would come to his aid. Tempted by such bait, the Black Prince led his troops into Spain, fought for Don Pedro and conquered Henry for him at the battle of Najera on April 3, 1367.

Overjoyed at this success Don Pedro presented to his deliverer then and there the splendid Ruby in order to get which he had murdered Abu Said. Immediately afterwards he went off to Seville to collect the rest of the promised treasure. So he said at least, but the treasure never came, and the Black Prince, after losing half his army from sickness, was obliged to quit Spain without other payment than the Ruby. He wore the gem in his hat, as an original and contemporaneous picture of him which Walpole saw testifies. It is said that in the fever-stricken plains of the Peninsula the Black Prince inhaled the germs of the disease which a few years afterwards carried him to the grave. The Ruby, large and splendid though it be, was dearly bought at such a price. Don Pedro was stabbed to the heart a few years afterwards by his victorious brother Henry, as he knelt before him praying for mercy. Here the curtain falls upon the first scene in the drama of our Ruby.

It rises again on the field of Agincourt, October 25, 1415. Henry v. of England, with his army reduced to fifteen thousand men, was falling back upon Calais from Harfleur when at Agincourt he encountered the French king and his nobility followed by an army of nearly fifty thousand men. The night before the battle Henry spent in disposing his forces to the best advantage, and on the morning he arrayed himself with a gorgeousness which has been commented upon by all contemporary writers. It was the fashion for kings to go splendidly into battle, and for a handsome young king of twenty-five like Henry

it was only natural that he should follow such a fashion to the fullest. His armor was gilt-embossed, but his helmet was the theme of especial praise. The useful iron head-piece was surmounted by a rich crown garnished with rubies, sapphires and pearls valued then at six hundred and seventy-five pounds.* In this glittering ornament the Black Prince's Ruby was a conspicuous feature. During the fight the king and his shining crown were to be seen in all parts of the field where the battle raged hottest. He fought like a lion for his life, unlike the kings of modern times who, if present at all, sit afar off and view the battle-field safely through telescopes.

Henry's crown and stout iron casque did him good service on that eventful day, for it is related how the French Prince, the Duke of Alençon, struck it a heavy blow with his battle-axe, which came near finishing Henry's career on the spot. Again several Frenchmen, excited by the blood-red glitter of the Ruby perhaps, swore to strike Henry's crown from his head or perish in the attempt. They accordingly rushed upon him in a body, and one of them knocked off a part of the crown, but the king defended himself bravely until supported by some of his own knights.

The sequel of this broken fragment of the crown is not so picturesque or heroic. One of the prisoners taken in the fight, a person named Gaucourt, declared after he was brought to England that he knew where the jewels were which had been struck from the crown. On promise of his liberty without ransom if he restored them, he went to France and got the lost gems, returning with them to London. It is a sorry thing to have to record of the hero of Agincourt that he appears to have taken the recovered jewels and then neglected to liberate Gaucourt.

Henry vi. followed his father's example in carrying his crown to the battle-field, but further than that the parallel cannot lie, for instead of winning a kingdom the luckless Henry lost his crown at Hexam (1464) and only saved his life by the fleetness of his horse. The crown which probably mounted our Ruby, was borne by a

* It must be remembered that the money value of the pound sterling in Henry's time was three or four times what it is now.

page who was killed, and the regal bauble was instantly carried off to Edward IV. who had himself forthwith crowned with it at York.

In that long and bloody struggle the honors of which are somewhat concealed in its graceful and poetic name, the Wars of the Roses, the Ruby adhered to the winning side. When Lancaster was bowed in the dust, it gleamed on the head of York, and so we bring it down to the youthful days of bluff King Hal.

Henry's daughter, Elizabeth, was even more extravagantly fond of jewels than he was himself. The numerous well-known pictures of the queen are more especially portraiture of Her Highness's dresses and jewels than anything else. Elizabeth did not set the Ruby away in her state-crown but kept it by her, no doubt for the frequent bedecking of her royal person.

She showed it upon one occasion to the Scotch envoy, Sir James Melville, under circumstances of peculiar interest. It was in 1564 when Elizabeth and Mary Stuart were both young women, the one comely, the other beautiful, and both were eagerly sought by every unmarried prince in Europe. Elizabeth had rejected all her offers. Mary had done the same. The English queen was lavishing honors upon her handsome Master of the Horse, Robert Dudley, and was generally understood to be preparing him for a seat on the throne beside herself. At this juncture she astonished the world by announcing that she had found a husband for Mary Stuart. This husband was Robert Dudley. The Scottish queen was considerably amazed at this proposal, and not a little annoyed at being offered for her consort a subject of such mean descent as the handsome Robert. However she did not say nay, and Melville was sent to London to negotiate the marriage. He stayed nine days at the court of Elizabeth and has given most vivid pictures of that great Queen.

One evening the Queen took him into her bed-chamber to show him some of her most precious belongings. She first opened a lettoun (cabinet) where he beheld a number of little pictures wrapped up in paper, with its name on each one written by her own royal hand. The first one was thus labelled: "My Lord's Picture." It was Leicester's portrait, and Melville holding the candle begged to see it, but Elizabeth made

difficulties about it; then the envoy pressed her to let him carry it back with him to show to his own queen, thinking apparently that the sight of the handsome face would move her to the marriage more than all political considerations. Elizabeth declared that she could not give it up as she had but that one, upon which Melville retorted that she had the original. "She shewed me a fair ruby, great like a racket-ball. I desired she would either send it to my queen or the Earl of Leicester's picture. She replied 'If Queen Mary would follow her counsels she would get them both in time and all she had, but she



THE CROWN OF ENGLAND.

(By kind permission of Messrs. Cassell & Co.)

would send a diamond as a token by me.' " It was the Black Prince's Ruby for which the envoy begged, but the poor Queen of Scots was fated never to get either the jewel or the earl.

This ruby was pierced at the top with a small hole to enable it to be worn suspended from the neck, a frequent occurrence with oriental gems which are worn without setting. The hole is now filled up by a small ruby, but this fact proves it to have been among the jewels with which James I. adorned his state-crown. The Earl of Dorset made a careful inventory of the

royal treasures, which is signed by the King himself. The description of the imperial crown, after reciting a bewildering number of diamonds, pearls, rubies and sapphires, winds up thus: "and uppon the topp a very greate ballace perced." This is manifestly the ruby in whose fate we are concerned.

Charles I. seems to have used his father's crown at his own coronation in 1626, a ceremony which was marked by two incidents afterwards found to have been ominous. There being no purple velvet in London Charles was robed in white velvet, which is an unlucky color it seems, and the Queen, Henrietta Maria, a silly and obstinate girl, refused to be crowned with him, owing to their religious differences. Fortunately the great Ruby was not left in the jewel-house at the time of Charles' execution, for had it been there we should have heard no more of it. Every thing which was found there was either melted down or sold by order of the Commonwealth.

With the return of the Stuarts the Ruby came back and ascended once more to its proper place in the Crown of England. All the appliances of a coronation had to be made anew for Charles II., so that the ceremony was in consequence somewhat shorn of its impressiveness. Charles' crown was, according to an old writer, "especially praiseworthy" for an enormous emerald seven inches in circumference, a large pearl and a ruby set in the middle of one of the crosses. This ruby although not particularized is sure to be the one we have traced thus far. It is so very much larger than any other ruby belonging to the Crown of England that whenever we find a pre-eminently large one mentioned in English history we may safely take it to be the Black Prince's Ruby. It could be mistaken for no other stone by any one who had ever seen it. A shining ball of blood-red fire slightly irregular in shape, "great like a racket-ball," is not so common an object that it could pass unnoticed by writers who take it upon them to describe crowns and other royal ornaments.

During the reign of Charles II. the Crown of England had a narrow escape of being stolen. This singular adventure happened as follows:

The Regalia then as now was kept in the Tower and was shown to visitors as still is

the case. The person in charge was an old man named Edwards who was in the habit of locking himself in with his visitors when showing the treasure. One day a gentleman, apparently a parson, and a lady, apparently his wife, called and saw the crown which they particularly admired, of course. The parson was Colonel Blood, a notorious Irish desperado. The lady became suddenly faint and was accommodated with a chair and other restoratives in the keeper's sitting-room where quite a friendship was struck up. The *soi-disant* parson cultivated the friendship assiduously, and finally proposed to cement it by a marriage between his nephew, apparently a soldier, and the daughter of the keeper. Blood came with the nephew who it is needless to say was merely an accomplice, and another friend. They asked to see the regalia and the unsuspecting old man led them into the strong room and locked himself in as usual. The moment he had done so he was set upon by the three ruffians, beaten, thrown down, gagged, stabbed in the body and left for dead. Then they managed to force open the case containing the Crown Jewels. Blood hid the crown under his cloak, the other two took the scepter and the globe, and then they opened the door intending to steal away. Just as they did so, young Edwards, a soldier, who by a singular chance arrived at that moment from Flanders, entered. In a moment after the Tower rang with the cry of "Treason! treason! the crown is stolen!"

The young man gave chase, aided by the guard at the gate, and eventually they succeeded in capturing Blood after a "robustious struggle" during which some pearls and diamonds were knocked out of the crown.

James II. gave his whole soul to the glories of his coronation, reviving ancient ceremonies and doing every thing with exactness, much in the same way as did Charles X. of France, and they both succeeded in losing the crowns thus elaborately set upon their heads. James used the crown made for his brother Charles whose head was somewhat larger. The result was what might have been expected—the crown did not fit, and was with difficulty kept in its place. Indeed, it wobbled so much that Henry Sidney put forth his hand to steady it saying: "This is not the

first time, Your Majesty, that my family have supported the crown."

James fled and the Ruby remained to greet William and Mary at their double coronation, and then it descended peacefully to the House of Brunswick, in whose service it has ever since remained.

The coronation of George IV. on July 19, 1821, was probably one of the most gorgeous pageants of this century. The King spent an immense sum upon his adornment (\$1,190,000), and not only that, but he gave close attention to the fashion of his clothes, spending days and weeks in anxious consultation over the length, size, shape, and material of all the garments that he was to wear. At last, having got all ready to his perfect contentment, the trappings were all brought to the palace, and the King dressed up one of his servants in his own royal clothes and then put him through the paces of a coronation while he looked critically on.

The crown for this occasion was large, costly and ponderous. It weighed nearly seven pounds and was made by Messrs. Rundell & Bridge. It was a mass of precious stones. At the back of the lower band was a large sapphire, one of the Stuart relics, and in front gleamed the fire-red stone which had looked down in Agincourt from the helmet of Henry V.

The last coronation although it occurred half a century ago is familiar to us owing to the revivifying process of the Queen's Jubilee. The crown, which was also made by Messrs. Rundell & Bridge, is less heavy than that of George IV. by three pounds and more. We will not enumerate its thousands of diamond, its hundreds of pearls, and its scores of rubies and sapphires. The ornaments consist of fleur-de-lys and Maltese crosses done in diamonds. In the center of the lower band of the crown is placed the large sapphire already mentioned and just above it, in the middle of a superb cross composed of seventy-five diamonds, gleams the famous Ruby. It stands out in bold relief and the red flash of its rays gives the needful touch of color to the sparkling mass of diamonds. The French say that the crown is heavy and without elegance, being in short altogether in the English taste.

The criticism may be just, for it is difficult to see how \$5,638,000 worth of precious stones, exclusive of the Ruby, could be packed on to the gear for the small head of a small woman with any great attempt at elegance.

The Queen was crowned on June 25, 1838, and Dean Stanley tells of a sudden ray of sunlight which streamed down upon the youthful sovereign as she sat in the Coronation Chair with the crown upon her head, producing an effect which was beautiful in the extreme. A Queen has always been popular with the English, and we can well imagine the enthusiasm which Victoria's girlish gracefulness must have aroused in people who contrasted her with the heavy uninteresting kings who had preceded her. This was the last great occasion upon which the Black Prince's Ruby appeared before the nation whose sovereigns it had so long adorned; and viewing the beneficent reign of the gracious lady whose coronation it then attended we can only say we hope it may long continue its uneventful existence at the top of the glittering pile in the Wakefield Tower.

In October, 1841, the crown, and all that therein is, had a narrow escape of perishing unromantically by fire. The Tower being then used as a military storehouse the fire rapidly spread, and it was thought advisable to remove the crown. The keys of the strong case where the regalia is kept are in the hands of three different officials, all at a distance. There was no time to be lost, as the place was getting very hot, so police inspector Pierse with a crowbar burst through the iron bars, forced himself in and handed out the precious articles whose value is estimated at five millions of dollars. Soldiers and policemen ran with the coronation baubles to a place of safety, and everything was eventually saved, though not before Inspector Pierse had been well-nigh roasted.

This is the last adventure that the Black Prince's Ruby has met with, and when we saw it the other day peacefully glistening in the sunlight it seemed hard to imagine that it had passed through so many dangers by fire and sword and had looked down on so many great scenes of royal splendor.

Mrs. Goddard Orpen.

CROSS AND CRESCENT IN THE LATER CRUSADES.

(Search-Questions in Mahometan History.)

121. How was the fall of Jerusalem regarded in Europe?

122. What three monarchs headed a third crusade?

123. What military event occurred in Palestine when the French and English came?

124. Near what place in Syria was Saladin defeated, and by whom?

125. How did Saladin regard this opponent?

126. What victory resulted in a peace between the Saracens and their enemies?

127. When did Saladin die?

128. What Pope sounded the alarm for a fourth crusade, and when?

129. What event ruined the Christian cause in this crusade?

130. Name the preacher of the fifth crusade?

131. Had this crusade any immediate results disastrous to the Moslems?

132. What Pope vigorously instigated a sixth crusade, and when?

133. What Moslem city in Egypt was the first object of the crusaders' zeal?

134. Mention one very important result of the sixth crusade.

135. Was anything of importance achieved in the seventh crusade?

136. When did St. Louis lead an eighth crusade, and how was it terminated?

137. When did he start upon the ninth?

138. What was the last victory of the crusaders and under whose leadership was it obtained?

139. What Moslem victory ended the Christian power in Palestine?

140. What English king many years later desired to engage in a tenth crusade, and where does Shakespeare allude to the fact?

whose supremacy was universally acknowledged by the Moslems.

83. Abu Jâfar.

84. Dâr al Salâm, The City of Peace.

85. Zoroastrianism, or fire-worship.

86. The Motázilite belief which interpreted the Korân allegorically.

87. The division between the Shîyas or Secretaries and the Soonies or Traditionists. The Shîyas believe in the Divine claim of the descendants of Ali to the leadership of the faith and the Soonies insist on the authority of the caliphs who preceded Ali.

88. To the party of the Shîyas.

89. To Hakim called Mokanna, "the Veiled," the leader of a sect which arose about 770.

90. Haroun-al-Raschid. See Tennyson's *Recollections of the Arabian Nights*.

91. Charlemagne.

92. It was generous and liberal and every branch of learning flourished under its influence.

93. The Barmecide family to which allusion is made were of great prominence in this reign; one of them, named Yahya, was the chief vizier and his son Jaafar governed Syria and Egypt. The caliph after having shown them every confidence suddenly grew jealous and murdered or imprisoned for life every member of the family.

94. It was taken by a Persian army under Mamun, son of Haroun-al-Raschid and brother to Amin the caliph, who was slain at the expiration of the siege.

95. Mamun, one of the greatest of the Bagdad caliphs.

96. A tribe that arose in Africa at the beginning of the tenth century claiming to be descendants of Ali who married Mahomet's daughter Fatima.

97. In the year 1050.

98. The Fatimite dynasty.

99. Motasim.

100. The capture of Bagdad by the Tartar Sultan Hulaku in 1258.

ANSWERS TO APRIL SEARCH-QUESTIONS.

81. The black flag.

82. It put an end to it and from this period therefore, there was no successor to Mahomet

Oscar Fay Adams.



A LESSON IN BATTERS.

(Cooking in the Public Schools.)



BEATING EGGS.

IT usually happens that the first thing the young cook undertakes to do is to make cake. I think this will be found to be the experience of fully nine tenths of the women who have struggled up through experiment and endeavor until they have pretty well mastered the difficulties of the art. I

couldn't tell you why it is so, but the fact remains undisputed and undisputable. I dare say, however, the reason is that every detail follows so quickly one upon another that the result is very quickly attained. It usually happens, too, that after the cake is compounded, it is left by the maker in more experienced hands to be baked.

But in the school-kitchen the cake-making, or indeed the mixing of any batters, does not come until the pupils have mastered the stove, learned to make and keep a fire, and to cook simple food without mixing. Those of you who have carefully watched the lessons from the beginning will see that they came along in sequence, and that each step taken prepares the pupils for the next one. In this way the teaching is systematic and, as in other studies, a principle is not taken up until the one which goes before it is thoroughly understood. Now, at last, the girls in caps and aprons have come to a real mixing-lesson; a

lesson in which flour is used for the first time. The teacher gives a little practical talk in chemistry, and shows them why the baking powder or the soda and cream of tartar, or the sour milk and soda are necessary in these compounds. I have no time, nor indeed is this the place to talk chemistry; all I can tell you is that the gas which is made by the acid and alkalies being mixed together is needed to make the batter light. I dare say most of you already know that. By her careful questioning the teacher sees that her pupils understand this bit of chemical teaching, a practical illustration of which they are to have in the lesson that is to follow the lecture and examination.

Batters are thin mixtures of liquid and flour, with the addition of the ingredients that are to make the gas. They are to be quickly prepared, and cooked at once, and, as a rule, are better eaten as soon as they are cooked, since they are likely to lose some of their lightness by standing. Batters also should be baked in a very quick oven. Indeed the lightness and delicacy of a batter-mixture, when cooked, depends upon the quickness with which it is prepared and baked.

You will learn, before you are through, that the term "batters" is a very elastic one, and covers all mixtures from griddle-cakes to muffins, taking in everything that comes between. People speak incorrectly of "frying" griddle-cakes. Really they are baked on two sides on a heated surface. When anything is fried, it is dropped in hot fat, so that it is completely immersed. Doughnuts are fried, and pan-cakes, and some kinds of muffins; drop-cakes and griddle-cakes are baked on a hot griddle, one side being browned, then the cake turned and browned

on the other side. Muffins, loaf-cake and gems, all of which come under the head of batter-mixtures, are baked in an oven.

Just a word here about frying, as possibly there may be no other place where it can so well be said. Of course you will understand that it is quite impossible to put within the limits of a series of papers like this, the whole detail of a year's work. The best that could be done was to take the more prominent features, and give those, passing over other processes, or at the most merely hinting at them. The chief idea of these papers is to show, as far as may be possibly done, the scope and thoroughness of the work, the systematic methods by which it is treated and the full arousal of a half-awakened interest all the country over, so that everywhere the school-kitchen will become as successful a feature of the school-system as it has grown to be in Boston. So about "frying": it is quite the habit of people to speak of frying, when they really mean something else. As in the griddle-cakes, when really the mixture is baked, so it is with other things. One often hears about frying fish or meat, when the process is *sautéeing*, or browning one side at a time in a little fat. Frying is, as the teacher has already told you, cooking by immersion, in very hot fat. I think you will understand the distinction in the terms, and will know when they are correctly used.

But to return to the lesson on batters. I had great fun, one day not long since, in hearing this very lesson given as a practical lesson by one of the normal class to her classmates. These bright young women were "making-believe be little girls" with all their might; but such precocious little girls—how they did puzzle the teacher with their questions! One girl was set to build the fire. She had been taught just how to do it, but she had a theory of her own, evidently, that she had been longing for the opportunity to apply, and here it came. Well, she made her experiment and it was a disastrous failure; the fire refused to burn. It simply wouldn't; and the more she tried the more it refused, and all the dozen girls had the most mischievous twinkle in their eyes, and only waited for the lesson to be over to rally her in her theories. Which proved, my dear little

amateur cooks who read this, that common sense is better than theory, and that there are some old-fashioned ways which we can't improve upon. The end of it was that the fire had to be made over from the very beginning, and at least half an hour of lesson-time was lost. It may be that it wasn't lost, after all; it has borne in upon this class of girls, that it won't do to try experiments in fire-building if one wants breakfast on time.

The simplest of all the batter-mixtures is the griddle-cake. This may be made with sweet milk and baking-powder, or with sour milk and soda. Some persons add an egg, but it really is not necessary; the cakes are just as light and toothsome without it as with it. Just here, as a preliminary to all batters, it will not be amiss to give the proportions of acids and alkalies in any mixture. If you are using soda and cream of tartar you will allow for every quart of flour, one teaspoonful of soda and two teaspoonfuls of cream of tartar. In measuring remember that the teaspoonfuls of soda must be level-full, while the cream of tartar should be rounded-full. The latter is always a fine, smooth powder, velvety to the touch, while the former is apt to grow lumpy. So it should be pulverized, then sifted before using, as you will then have more nearly correct proportions.

When you use sour milk you do not need the acid of the cream of tartar, but you want the soda to counteract the acidity in the milk, and the correct proportion is one level teaspoonful of soda to every pint of milk. In soft ginger-breads and some batter-puddings you will use molasses, and as this, in spite of its heavy cloying sweetness, contains acid you will need the soda to counteract it. If you are making a batter, the proportion of soda is one level teaspoonful to one cup of the molasses; if the dough is to be stiff—those will be considered later—one half a teaspoonful of soda is sufficient for the cup of molasses. If you use baking-powder, in place of cream of tartar and soda, the proportion will be one level teaspoonful of baking powder to each cup of flour or meal, whichever you use.

And now for the griddle-cakes. The rule on the school-kitchen cards, by which the class is cooking, gives the following proportions: one

cup of flour; one saltspoonful of salt; one teaspoonful of baking powder; one scant cup of sweet milk, and one teaspoonful of melted butter. This may be varied by using sour milk in the same proportion as the sweet, and soda in place of baking powder. If any one is so fortunate as to live on a dairy farm, buttermilk may be substituted for the sour milk, in which case the tablespoonful of melted butter may be omitted. Sift the dry ingredients together, that is, the flour, baking powder (or soda) and salt; then add the milk, making a batter about like thick cream. Add the melted butter last. Cook on a well-greased griddle that is hot enough to bake the cakes without burning them. When the upper side has filled with bubbles turn the cake over and brown the other side.

There are some persons who object to the use either of baking powder or soda and cream of tartar, but who make batters light without them by excessive beating. Among the quick cakes prepared by them in this way are "pop-overs;" these are as light as vanity and there is just about as much to them. If you wish to try them you may use one cup of flour, one cup of milk, an egg, and one salt-spoonful of salt. Sift the salt and flour together and add half of the quantity of milk slowly, making a smooth paste; when it is well mixed and no lumps of flour, no matter how tiny, are left, add the remainder of the milk and the egg, which has been beaten to perfect lightness. Beat the whole together thoroughly, and cook at once in hot buttered gem pans or earthen cups, for half an hour or until the cakes are well "popped over," inventing their name, and of a delicious golden brown. You may use these as breakfast cakes, eaten with butter like muffins, or you may serve them for dessert with a rich, hot sauce. You will like them either way.

When the "big blizzard" struck New York, a lady well-known as an editor and writer, got snow-bound in a little town just outside the city; so prisoned were they by the elements, that neither "butcher nor baker, nor candlestick-maker" could get at them, and as there were quite a number in the house, they soon ran out of several kinds of provisions. Among them were eggs; they had nothing for muffins for

breakfast, when suddenly somebody remembered "snow pan-cakes," and they were speedily concocted, and so successful were they that every body went away, when the blockade was raised, singing their praises. The story got into all the papers, and so did the receipt; but the cooking schools were ahead of the papers, for they had already taught the girls how to make them. Use one half cup of flour, and one salt-spoonful of salt (sifted together), add one half a cup of milk and beat very thoroughly; when it is beaten stir lightly in a heaping tablespoonful of newly-fallen snow. Cook like large griddle-cakes, and while hot spread with butter, sugar and nutmeg, or with jam, roll them over and over like a jelly roll, and eat them at once; don't talk until the last mouthful is finished, then be as ecstatic as you please.

And now I am going to tell you, just as Miss Hope did the girls in School-kitchen No. 1, how to make an old-fashioned molasses gingerbread. The following are the proportions: one half cup of molasses, one half tablespoonful of ginger, one saltspoonful of salt, one half teaspoonful of soda, one tablespoonful of clear beef dripping—or you may use butter—one quarter of a cup of hot water (boiling) and one cup of flour. The ginger, soda and salt are added to the molasses; the softened dripping is then put in, and the mixture beaten well together; next the boiling water is added, then the flour; beat again thoroughly, pour into a well-greased shallow pan and bake in a hot oven. It will take about twenty minutes to bake the loaf.

I will give you the School corn-cake, and that must finish the batters, although there is more that might be said. When you leave the School you will learn much more about it. Don't you wish the School-Kitchen was an accomplished fact in your town? And are you all doing missionary work toward that end? You know you have something to do about making public opinion in all the matters in which you are deeply interested. Fathers and mothers are pretty sure to feel what their children feel, and to desire to give them that they want, when they feel that the "want" is sensible and right. And who is the "public" that is so much talked about if it isn't the aggregate of fathers and mothers all through the community?

But we'll never get to the corn-cake if we don't go on. We'll make ready with one cup of flour, one half cup of fine yellow corn meal, one quarter of a cup of sugar, one half teaspoonful of salt, one tablespoonful of cream of tartar—if you use sweet milk, omit it if the milk is sour—one half teaspoonful of soda, one cup of milk—either sweet or sour—one egg, one table-

spoonful of dripping or butter. Mix all the dry things together; beat the egg, add the milk to it, put it into the mixed dry ingredients, mix well together, and last of all add the melted butter. Beat well and bake in muffin rings or a shallow pan for about twenty minutes. Then you have a corn-cake that is good enough for your breakfast, or mine, or Queen Victoria's.

Sallie Joy White.

THE SANCI.

(Stories about Famous Precious Stones.)

THE diamond which is known as "the Sanci," or, as it is sometimes written, "Sancy," has been not inaptly termed a Sphinx among stones. Until recently writers have been accustomed to begin the story of this diamond with Charles the Bold, Duke of Burgundy and, with numerous variations of detail, to derive it from him.

Now Charles the Bold had three diamonds which were famous throughout Europe as well for their size as for the fact that they were cut by a European lapidary. Louis de Berquen, who flourished in the fifteenth century, discovered by chance the true principle of diamond-cutting. He rubbed two diamonds together and found that one would bite upon the other, and that a high polish could thus be effected. The Duke confided his three great diamonds to the hands of this cutter and was so delighted with the result that he rewarded the clever lapidary with three thousand ducats. Of the diamonds thus cut, one was presented to Pope Sixtus IV. and another to Louis XI. of France. This latter diamond was set heart-shaped in a ring between clasped hands, a symbol of truth and faithfulness, and as such was a singularly inappropriate gift to one of the most perfidious monarchs who ever sat on a throne.

The third stone the Duke kept for himself and wore it on his finger. This is the one writers have been pleased to call the Sanci, but they agree in no other detail of its history. The description of the Sanci—an almond-

shaped stone covered all over with facets—does not agree with the description of the Duke's diamond; but this awkward fact has been easily got over by not mentioning it. Still on making the Sanci belong to Charles the Bold a history had to be furnished for it. Accordingly we learn that it was lost at the battle of Morat in 1476—and also at Nancy in the following year; that it was found by a Swiss soldier under a cart—and that it was taken from the frozen finger of the corpse of Charles; that it was sold for two francs to a priest—and that it was sold to a French nobleman; and so on through a maze of absurdity and contradiction.

The diamond known as the Sanci and once an ornament of the crown of France never belonged to Charles the Bold. It is an Indian-cut diamond, and it was first brought to Western Europe in the reign of Henry III. of France by his ambassador at Constantinople, the Seigneur de Sanci. This person deserves a word or two.

Nicholas Harlay de Sanci was born in 1546 and filled many posts of importance during the reigns of Henry III. and Henry IV. He was a Huguenot, but being immensely wealthy he was held in favor even by the son of Catherine de Medici. His magnificence and his jewels were the admiration and envy of his contemporaries. He changed his religion backward and forward three or four times and finally under Henry IV. settled into Catholicism. For this reason, if for none other, he was hated most

cordially by Sully who mentions him with dislike in his *Memoirs*. According to Sully he was clever but arrogant; not very clear-headed for business, yet sometimes hit upon expedients which would escape more phlegmatic minds. We shall see further on how this estimate was borne out.

Henry III. in a state of chronic war and equally chronic poverty turned in his distress to his wealthy subject, and de Sanci responded as a wealthy and loyal subject should. The King needed troops to enable him to cope with the League. They must be faithful—therefore they must be Swiss, who would only come upon certain payment of their wages. In order to raise the money for these troops de Sanci offered to pledge a great diamond, worth twenty thousand crowns, which he had bought from the Portuguese Pretender, Dom Antonio, who on flying from Lisbon had carried off the crown jewels. The King gratefully accepted the offer and the diamond was sent for. A trusty valet was the person deputed to carry the precious freight, but the valet was waylaid and murdered.

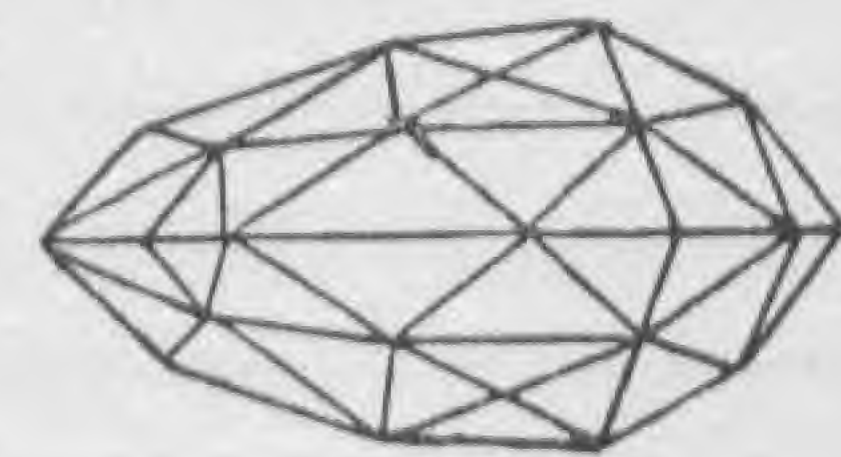
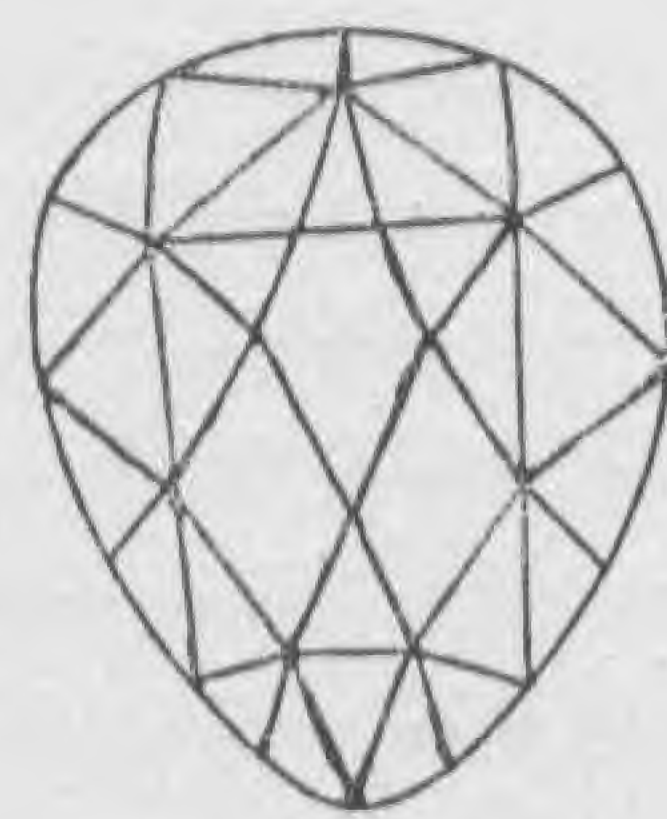
Dismayed at the probable consequences of this disaster, the King roundly abused de Sanci for having trusted his diamond to a servant, but the latter persistently declared his belief that the diamond was not irretrievably lost. After much difficulty and a considerable lapse of time the body of the murdered valet was found, upon which de Sanci ordered it to be dissected, when the missing diamond was discovered in the body. This must have been one of those happy expedients which de Sanci's ready wit enabled him to hit upon. Few "phlegmatic" people would have thought of looking for a diamond in such a concealment in the days when de Sanci lived.

In our enlightened times diamond-swallowing is largely practised by the thieves who infest the mining regions of South Africa. The police accordingly are supplied with emetics and purgatives as well as rifles and ball cartridges. Quite recently a notorious thief was captured and put under medical treatment. The first day's doctoring produced three diamonds, the second brought to light eight more, and the third day gave fourteen; and after all the debili-

tated patient triumphantly declared, "There's plenty more to come, Baas."

It has been thought advisable to give in detail the story of de Sanci's valet and the diamond because the adventure is usually attributed to the diamond which forms the subject of this article. Upon careful examination it has appeared to us probable that it really happened to the diamond bought from Dom Antonio and that this diamond was a distinct stone from the Sanci proper. Both gems however seem to have had the same fortunes and their histories for a century and a half run in parallel lines.

De Sanci, whose extravagance was unbounded, gradually became embarrassed and from time to time no doubt disposed of his gems in order to raise money. The date of the purchase of the Sanci is fixed about 1595, when Elizabeth who was inordinately fond of jewels added it to the Crown of England. In 1605, Sully received an order from Henry IV. to buy up all the jewels of Monsieur de Sanci, whose affairs had



THE SANCI: TOP AND SIDE VIEWS.

come to a crisis. Neither the Sanci nor the Portuguese diamond were among these valuables thus bought in for Henry.

In the reign of James I. of England there appears amongst his Majesty's personal jewels one of particular note called the "Portugal" whose name does not appear in previous inventories of the English jewels, and this we are inclined to believe was the diamond which de Sanci purchased from Dom Antonio, and which had so many adventures. In the absence of direct proof however this identification should be accepted only provisionally. Shortly after his accession James caused a number of jewels to be reset, and one ornament, known as the "Mirror of Great Britain," was considered to be the master-piece. It is thus described in the official inventory of 1605:

"A greate and riche jewell of golde, called the Myrror of Greate Brytagne, contayninge one verie fayre table diamonde, one verie fayre table rubye, twoe other lardge dyamondes cut lozengewyse, the one of them called the stone of the letter H of Scotlande garnyshed wyth small dyamondes, twoe rounde perles fixed, and one fayre dya-monde cutt in fawcettes bought of Sancey."

That this was the diamond subsequently known as the Sanci there can be no doubt. The description "cut in facets" almost establishes the fact without the mention of the name of its recent owner.

The diamond called the "Stone of the letter H" belonged to Mary, Queen of Scots, and was greatly valued by her. It was a present from Henry VIII. to his sister Margaret on her marriage with James IV. of Scotland. In her will the Queen of Scots bequeaths it to the Crown, declaring that it should belong to the Queen's successors, but should not be alienated.

When in 1623 Charles, the Prince of Wales, went on his love-trip to Madrid along with Buckingham to woo the Infanta, he had an enormous amount of jewels sent out to him in order to make friends for himself at court. As was already mentioned in the article about the Pelegrina, these magnificent gifts were valued at no less a figure than one and a half millions of dollars. Buckingham, who did not lack for audacity, had the impudence to write to King James asking for the "Portugal" itself; but the over-indulgent monarch, though he scarcely ever refused anything to his beloved favorite, did not comply with this request. The Spanish marriage fell through, and Charles and Buckingham returned to England.

A couple of years afterwards, Charles being King, the stately Duke was sent to Paris to bring back the king's bride, Henrietta. On this occasion Buckingham seems to have exceeded himself in splendor. He was provided, says Madame de Motteville, with all the diamonds of the Crown and used them to deck himself. Possibly this may be merely an expression to indicate the profusion of Buckingham's jewels, and diamonds should not be read literally. Be this as it may, it is a fact that the Duke appeared at a ball at the Louvre in a suit of uncut white velvet, sewn all over with diamonds. These diamonds moreover, were sewn

on very loosely, so that whenever the wearer passed a group of ladies he particularly wished to honor, he shook himself, and a few of the diamonds fell off. This senseless extravagance was resorted to in rivalry of the Duke of Chevreuse, the most profuse of the French nobles, who at the ceremony of the betrothal had appeared in a suit embroidered with pearls and diamonds, it being contrary to a sumptuary law to embroider with gold or silver.

Charles did not long enjoy the tranquil possession of his diamonds. By the time he and Henrietta had ceased to quarrel he and his Parliament had begun to do so. The Queen pledged a large number of the crown jewels in Holland in order to raise funds for her husband, but these consisted mostly of pearls and did not include either the Sanci or the Portugal whose connection with the Crown of England was not yet to be severed.

In 1669 the court jeweler of France, Robert de Berquen, whose writings have already been alluded to, says :

"The present queen of England has the diamond which the late Monsieur de Sanci brought back from the Levant. It is almond-shaped, cut in facets on both sides, perfectly white and clean, and it weighs fifty-four carats."

Berquen was likely to be well-informed both from his profession and from his position. His book is highly interesting and contains some very quaint passages. Thus, when writing of diamonds he assumes a critical attitude in surveying past writers and their deductions, and rejects with scorn and as utterly unworthy of belief the statement that a lady, having two large diamonds, put them away in a box and found, on again examining the box, that they had produced several young ones.

The expression "the present Queen of England" has considerably puzzled many writers, since at that date there were two queens of England, namely the dowager Henrietta and the consort of Charles II., Catherine of Braganza. It seems most probable that the expression refers to the latter, for some years previous to the Restoration we find Henrietta disposing of the diamond to the Earl of Worcester. The following letter is in her hand :

"We Henrietta Maria of Bourbon, Queen of Great Britain, have by command of our much honored lord and master the King caused to be handed to our dear and well-beloved cousin Edward Somerset, Count and Earl of Worcester, a ruby necklace containing ten large rubies, and one hundred and sixty pearls set and strung together in gold. Among the said rubies are also two large diamonds called the 'Sanci' and the 'Portugal,'" etc.

After the Restoration Charles II. made strenuous endeavors to collect the scattered jewels of his Crown. How or when he recovered the Sanci and the Portugal we cannot now tell. It would be very like the devoted Worcester who ruined himself for the Stuarts to have given them back to Charles without stipulation, and it would be very like a Stuart to have accepted them and never to have paid for them. Worcester died in 1677 and two years later, as we have seen, the Sanci was in the hands of the "present Queen of England."

Along with the Crown, the Sanci descended to James II., and no doubt figured at the extraordinarily fine coronation which inaugurated his disastrous reign. The Queen had a million's worth of jewels on her gown alone, and "shone like an angel," says a contemporary, who was so dazzled by her splendor that he could scarcely look at her. When James lost his crown he managed to keep hold of the Sanci and also, presumably, of the Portugal. Indeed the jewels of England for a long time served to keep the famished court of the Stuarts around James and his son. Gradually they were sold to meet the exigencies of the various Pretenders till nothing of value was left for the last Stuart, the Cardinal of York, to bequeath to the English King. Among the first to go was the Sanci which James II. sold to Louis XIV. for twenty-five thousand pounds about the year 1695.

From this date for one hundred years the Sanci ranked third among the French jewels, being valued at one million of francs (\$200,000). The first and second on the list were respectively the Regent, valued at twelve millions, and the Blue, at three millions.

At the coronation of Louis XV. in 1723, the Sanci bore a distinguished part.

The little King, aged thirteen years and a half, was crowned at Rheims with all the splen-

dor and tediousness of ceremonial for which the French court had become renowned. Louis, previous to the imposition of the Crown, was dressed in a long petticoat garment of silver brocade which reached to his shoes, also of silver. On his head he wore a black velvet cap surmounted on one side by a stately plume of white ostrich feathers crested with black heron's feathers. This nodding head-dress was confined at the base by an aigrette of diamonds, among which the Sanci was chief.

At the coronation of Louis XVI. in 1775, the Sanci had the honor of surmounting the royal Crown in a fleur-de-lis, which was united to the rest of the diadem by eight gold branches. Just beneath the Sanci blazed the royal Regent with the Portugal, the Sanci's old companion and fellow diamond. Pity that a head once so gorgeously bonneted should roll in the bloody sawdust of the guillotine!

The Sanci shared the fate of the Regent in being stolen in 1792, but it did not share its luck in being found again. As early as February in that eventful year rumors began to circulate of the intention of the royalists to lay violent hands upon the Crown Jewels, but the commissioners ordered to make the inventory for the National Assembly declared such rumors devoid of truth. The fact remains however that all the diamonds were stolen, and all, except the Regent, disappeared completely for many years.

In 1828 the Sanci comes to light once more. A respectable French merchant sold it in that year to Prince Demidoff, Grand Huntsman to the Czar, for a large sum, apparently one hundred and eighty thousand dollars. One would like to know where the above respectable merchant got the diamond, but unfortunately he seems not to have furnished any history with it—perhaps because it might have made him appear less respectable.

Four years later the Sanci went to law. Prince Demidoff, it seems, agreed to sell it to a Monsieur Levrat, director of Forges and Mines in the Grisons, for one hundred and twenty thousand dollars, and Monsieur Levrat agreed to pay the price. Afterwards he contended that the diamond had been spoiled by being re-cut, which was very likely, and that it was worth

only twenty-five thousand dollars. To this remarkable reduction in price Prince Demidoff seems to have assented, and he delivered over the stone to Monsieur Levrat who was to pay by installments. Instead of paying, he pawned the stone, and the defrauded Prince sued him, won his case, and got back the diamond. This was all the more lucky for the Demidoffs, since in 1865 they were able to sell it for one hundred thousand dollars.

While in the hands of Prince Demidoff the Sanci is reported to have had some strange adventures of which the following is an example:

It was in the shawl of the Princess one day, when, finding it hot, she handed the shawl to a friend to carry for her. The friend was a very absent-minded scientific personage; he put the Sanci pin into his waistcoat pocket for safety and forgot all about it when returning the shawl to the Princess. She forgot the pin also (a likely incident this). Next day the Sanci was missing. Consternation! Scientific friend hurriedly interviewed. He remembered the incident. Where was the waistcoat? Gone to the wash (of course). O, horror! Washerwoman frantically sought. Where was the waistcoat? — in the tub? Was there anything found in the pocket? Yes; a glass pin. Where was it? Had given it to her little boy to play with (of course). Where was the boy? Playing in the gutter! Despair! The little fable ends nicely, as a little fable should, and there is joy all around.

The person who gave the Demidoffs one hundred thousand dollars for the Sanci was Sir Jamsetjee Jeejeebhoy the great Bombay merchant and millionaire. And thus after many wanderings the Sanci at length returned to the Orient whence, to judge from its cutting, it had originally come. However its stay in India was but brief. It came back to Paris for the Exhibition of 1867, where it found itself once more beneath the same roof as the Regent. It

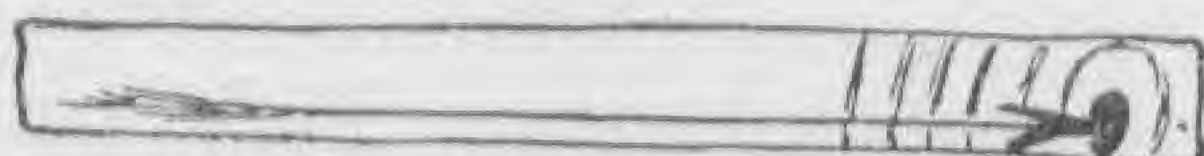
was nevertheless not in the same show-case as that imperial exhibit, for it belonged to Messrs. Bapst who were willing to sell it for the sum of one million of francs, the exact amount at which it had been valued previous to the Revolution.

Some one rich enough to buy it and fond enough of diamonds to spend such a sum on a jewel was found again in India. This time it was a Prince. The Maharajah of Puttiala became its owner. When on the first of January, 1876, the Prince of Wales held a Grand Chapter of the Star of India at Calcutta, he beheld, in the turban of one of the Rajahs, the diamond of his ancestors. The Maharajah, says the *London Times* correspondent, wore five hundred thousand dollars worth of the Empress Eugénie's diamonds on his white turban, and the Great Sanci as pendant. These were supplemented by emeralds, pearls and rubies on his neck and breast.

Of all the diamonds whose history we have followed this one certainly carries off the palm for the variety of its adventures. The Koh-i-Nûr is an older stone and has belonged to many kings, but the different countries in Asia are, to our minds at least, much less clearly distinguished from one another than our European states. For a diamond to pass from the hands of an Afghan chief to a Persian Shah seems less of a change than for it to go from the treasure-room of the Tower of London to the Garde Meable of Paris.

Now that the Sanci has been found and is so widely known it is to be hoped that it will be kept always in view. Diamonds and heads are often unaccountably lost in the seraglios of Asiatic princes, but we must only hope that oriental potentates are now sufficiently enlightened to understand that we, of the Western World, wish to be informed of everything that happens, whether it be the fall of a dynasty, or the sale of a diamond.

Mrs. Goddard Orpen.





CATCHING fish is surely a very novel use for a bottle, but the feat is easily accomplished and affords a great deal of amusement and excitement.

A number of empty champagne or beer bottles being obtained, each one is to be filled with sand or shot until it will stand upright when floated in water. Each bottle is then tightly corked, and a strong tapering ash or hickory stick, eighteen inches long, is passed through each cork, this stick having a small, bright-colored burgee (a three-cornered flag) at its tip. Next a piece of wire is twisted around the neck of the bottle, so that it cannot slip off, and in this wire a large loop is made to which the fish-line is fastened. The length of the line must depend entirely upon the depth of the water to be fished; ten feet is usually long enough.

The hooks, for general use, should be of medium size—say number five. Moderately heavy sinkers are attached to the line. A swivel will make the outfit complete, although not absolutely necessary. If the bottles themselves cost nothing, a dozen may be prepared at a cost of twenty-five cents.

The bottles, thus having been made ready, may be used in a number of ways. They may be set in a row on the bank of a stream, or on a pier, close to the edge; the hooks, having

been properly baited, are to be dropped into the water. It will not be long before one of the bottles will begin to waver and suddenly take a mighty leap overboard, swimming off and bobbing around in a very peculiar manner. The excitement which a row of these fishing-bottles will arouse, and the guessing as to which bottle will go first, is very amusing, and not to be despised as sport.

One or more of the bottles, having popped off, and been taken in tow by a fish, must now be rescued; this can be done by means of a long stick having three hooks, without barbs, lashed to it, back to back; some one of the hooks will soon catch into the loop of wire around the neck of the bottle, and you can draw in both bottle and fish.

Where there is a lake or pond at hand and a boat available, the bottles may be taken out from shore and set afloat around the boat. If the fish are at all lively and there are many bottles to tend, there will be some very exciting sport in chasing the bottles, for they will start in all directions at every moment.

Where there is a number in the party "sides" may be chosen—two sets of bottles being furnished, an even number to each, and each set having a flag differing in color. The side catching the most fish wins whatever prize is to be awarded.

For sea-fishing an additional arrangement is needed, because the waves cause the bottles to bob up and down so that it is hard to know when a fish bites. The flag is brought into use as a signal. The upright rod is furnished at its tip with a small screw-eye, and a strip of tin three inches long is fastened by its lower end to the lower end of the rod parallel with it, so as to make a spring-clip. The flag is fastened to the end of the line, and is set by being

caught in the clip made by the strip of tin. In this position, the flag is "lowered," as it were, being at the foot of the rod; but when a fish bites, he pulls it away from the clip and raises it to the top of the rod where it stops, being too large to go through the eye. That the flag may fly straight, and not be drawn into the eye and crumpled, it is best to sew it to a straight bit of wire, having a loop at the top to which the line is tied.

Another improvement is to paint the inside of the bottle white, by pouring in white paint, shaking it around and then pouring it out and letting the bottle dry. Then prepare the bottle as described, and should a large fish turn the bottle upside down, as he very likely will, it can be readily seen and followed.

Always wind up the lines carefully when through using them and stow the bottles away in a box made for them. Then they will last a long time and probably afford amusement to a great many.

Now, a word to camping parties: Don't, whether fishing by this or any other method, catch fish for the sake of the sport, and then throw them away. Such a waste of life, even if nothing but fish-life, is cruel. No true sportsman will countenance such slaughter. If more

fish are caught than can be eaten, they may be saved by pickling or smoking. Salted trout are palatable and a luxury; and smoked trout is a delicacy so much the more a luxury that it is seldom to be obtained except in the private families of sportsmen. Its preparation on a small scale is easy. A large packing box is prepared for the purpose, by boring a number of holes through one end. A few cleats are nailed inside near the top opposite each other and the cover is hinged on. The lower end is removed and the box is then set upright on the ground. The fish being cleaned, are slit completely through to the backbone and spread on small twigs whose sharpened ends thrust through each side hold the fish open. Large branches are laid across the box resting on the cleats inside, and on these the fish are laid, having been well salted. A fire of chips is made under the box, and when well under way is smothered with green twigs which will make a dense smoke. The cover is then shut and after a while a board is laid across the holes in the top. There will then be nothing left of the fire but smoke. Fresh fish are put in as fast as caught and a fresh fire is built every day, the fish remaining as many days as is necessary to thoroughly cure them.

Ives Everett Warren.

RUNNERS AND FLIERS.

(Geological Talks.)

AN "Ostrich Farm" seems curiously out of place in the United States. Yet there are ostrich farms here. Last February we visited one near Los Angeles in California. It was situated in a narrow valley between two ridges on whose summits lay new-fallen snow. In the valley it was warm and bright; green leaves were on the trees and green grass covered the ground. The place is somewhat of a resort, and among its attractions is a menagerie of various wild animals. A large part of the grounds is laid out into fenced pens of considerable size. These are for ostriches. In some were little ostriches

not yet a year old; ugly-looking little fellows they were too; dirty brown-gray in color. In others were half-grown birds. In most however was a pair of adult ostriches. The males were the handsomer, the colors being better marked. Queer great creatures with long legs heavily protected in front with horny scales. There were two toes to each foot — and such clumsy-looking toes! The thing most surprising to me was the great round hip and the wonderfully easy motion of the leg at that joint. No wonder they can run, with such powerful and perfectly acting limbs! They are very fond of eating clover, and it was

great sport to watch them eat it. It did not look like bird-eating, but like the biting and chewing of a beast.

All birds are either Runners or Fliers. To-day almost all birds are fliers, and very few are, like our ostrich, of the running type. There was a time when this type was larger and more numerous than now.

Birds are not of great importance geologically. Yet fossil birds may teach us some interesting things. They are peculiarly rare in rocks. There are good reasons why this is so. To begin with, those animals only are likely to be preserved in rocks which live in or near water where sediments are forming. So land animals are less likely to be found among fossils than aquatic forms. Yet mammals and heavy reptiles may be overtaken by floods or mired in bogs and thus be imbedded. Birds would not be liable to be trapped in either of these ways. Again their bones and dead bodies are light and not likely to sink, if they do fall into the water. In all these ways birds are unlikely to present fossil forms. Yet there are quite a number known. Of these many are, as might be expected, divers and waders. Bird-remains are generally from comparatively recent rock formations. The oldest date from the Reptilian Age. They are quite common in the Tertiary. Thus in France in the Middle Tertiary seventy kinds have been found, and Edwards says of these: "Parrots and trogons inhabited the woods; swallows built in fissures of the rocks; a secretary bird sought in the plains the serpents and reptiles which must have furnished its nourishment. Large adjutants, crows and flamingoes frequented the banks of the water-courses, where larvæ of insects, and mollusks, abounded. Pelicans floated in the midst of lakes." These forms suggest that at that time France was supplied with great fresh water lakes and had climate, vegetation and animal life such as to-day occur in Africa.

The most ancient bird known is the archæopteryx from Solenhofen in Bavaria. You remember there were many reptiles anciently that were like birds. This bird is like a reptile in some respects. At Solenhofen they find an extremely fine-grained dark slate that is much used for lithographic plates. Its fineness of

grain renders it very well adapted to preserve delicate animal structures. In this slate have been found at least two skeletons of this strange and ancient bird. Its backbone ran out to the very end of the tail and the tail-feathers were arranged along both sides of this. The jaws probably contained teeth. The wings were unlike those of modern birds, being furnished with claws at the bend. It was a flying and climbing bird, and was about the size of a crow. Of course we do not know what its colors were, or its voice. The peculiarities mentioned about its tail, teeth and clawed wings are all reptile like.

The most interesting fossil birds are from the the cretaceous rocks (later part of Reptilian



age) of Western United States. Professor Marsh of Yale College has made a most careful study of them and written a book describing them. There are two types and both had teeth. One, the larger of them, called hesperornis, was like the loon or "great northern diver" in its general shape and habits. Its wings were short, and its tail aided it in swimming. It had numerous and sharp teeth set into grooves in the jaws. The end of the upper jaw however was beak-like and without teeth. It was a powerful swimmer and probably lived on fish. When it stood erect it was five or six feet high — much larger than any modern "diver."

The smaller type, called ichthyornis, had small, sharp teeth, each set in a distinct socket in the jaw. It was not larger than a pigeon, and was a flier, though it could probably dive and swim.

Fossil birds present us some most interesting

examples of "recent extermination" or "extinction." We have already had examples of what is meant by extinction. The great reptiles have passed away; there are perhaps no mastodons or mammoths now living; great orders of fishes have disappeared. The earlier geologists



THE GREAT AUK.

thought that at certain times in the earth's history all animals and plants were killed off and new forms put in to people the world. Thus, at the end of the Devonian Age all animals and plants became extinct at once and a new creation began with the Carboniferous. This is not the present view. An animal species may die

out at any time and without all the animals that are its companions dying too. Old species are dying to-day and new ones are probably arising. There was a time when bison or "buffalo," wandered in great herds over much of the United States. Now but few herds are left and they will probably disappear ere long.

Among our birds of recent extinction we will first consider the great auk. It is supposed now to be extinct, yet Audubon saw it alive, I think. It was a very common bird not long ago. From Harvey and Hatton's *Newfoundland* and elsewhere we make some notes. In 1774 the great auks were described in the *English Pilot* as "large fowl about as large as a goose, a coal black head and back with a white spot under each of their eyes. They never fly, their wings being very short, covered with down and short feathers." In those days they were so plenty that men on fishing vessels used them for food and salted down tons of them. They even used the bodies for fuel, eating the eggs. Often the bodies were laid away in stone pens and sometimes these so put away became "natural

mummies," and have supplied material for study. In various museums there are now about seventy skins, about the same number of eggs and some bones. This is all now left of this curious bird. Yet two hundred years ago they were so common that the coasts literally swarmed with them; they waddled slowly about in an erect position with broad webbed feet and short wings like the flippers of a seal. Perhaps not a living specimen has been seen for nearly fifty years, the last one having been shot in Iceland in 1844. Here is an extinction of recent date. If white men had not appeared on the scene, the great auk would probably yet be swarming on the rocks of Newfoundland. These birds were admirably suited to their surroundings. They were powerful swimmers; they could go on land to escape their enemies of the sea, and into water to escape land foes. Only when a new enemy, against which they were not fitted to cope, appeared, they diminished and disappeared.

Several interesting birds have recently disappeared from Madagascar, Mauritius and New Zealand. The first we will notice is the *æpiornis*, known only by its fossil remains. It lived in Madagascar and was a huge ostrich-like bird. It is known only by its bones, fragments of egg-shell and two or three perfect eggs. These were all found in river gravel deposits and so are quite recent. These eggs are the largest known. Two in the Garden of Plants in Paris are said to be—one thirteen by nine inches, the other twelve by ten inches in diameter. How many hens' eggs would that make?

The dodo is an old bird of Mauritius, but unlike the *æpiornis* it lived on long enough to be known to the early white voyagers. It was a most odd, clumsy, giant pigeon, without ability to fly and with no means of defense. The Portuguese sailors used to send home living specimens in the sixteenth century. The last one seen was in 1681. Dutch artists have left pictures of the dodo as it looked in life. In various museums there are preserved a head, two feet, and many bones. In 1866 several complete skeletons were discovered in a swamp. The dodo died off rapidly after the whites introduced domestic animals into Mauritius.

Most interesting of these giant extinct birds are the different kinds of moa of New Zealand.

Rev. W. Colenso in 1838, Rev. Richard Taylor in 1839, and Mr. Booth much later, carefully studied these forms. The remains are very numerous and varied, consisting of abundant bones, gizzard stones, fragments of eggs, ligaments, skins, feathers, etc. The feathers were whitish at the tips, the barbs reddish brown. A few nearly perfect eggs are known, in one of which are still preserved the remains of a little moa chick. The eggs are large; one is nine and one half inches, in its longer diameter. The moa itself was a great running bird, not adapted to flight, and much larger than the ostrich, being ten or twelve feet high. Its drumstick was nearly a yard long. The remains occur in all the looser deposits of New Zealand, whether of lake, river, or glacial origin. Mr. Booth describes the most interesting locality. It was an old swamp; the lagoon consisted of two feet of black peat and silt overlying and mixed with bones to the very bottom. These bones were most abundant in one portion occupying an area forty feet long, eighteen feet across and two to four feet deep. Nearly seven tons of bones were taken out. One of the most curious and interesting facts connected with these specimens was a peculiar admixture among the bones of quartz gravel and smooth stones. These were in little piles underneath pelvic and breast bones, which had apparently not been disturbed since the bird died. It is probable that they were stones swallowed by the bird to assist it in digestion, by grinding up the food. The ostrich swallows stones now as do some other birds. There were no eggs or young moas in this remarkable collection. Mr. Booth thinks this lot of birds were killed out by the coming on of a cold climate — perhaps an extension of the glaciers — that the birds took refuge in what was then a warm spring, and that on account of increasing cold they ceased to lay eggs as they could not be hatched. The seasons grew colder and colder and at last no food being found the birds died here in the warm waters. How long ago did the moa become extinct? Views vary. Some think within the last one hundred years. Booth thinks at the time of the extension of the glaciers. It seems to me that it could not have been very long ago. The natives of the islands believe that there is still one moa alive, in a

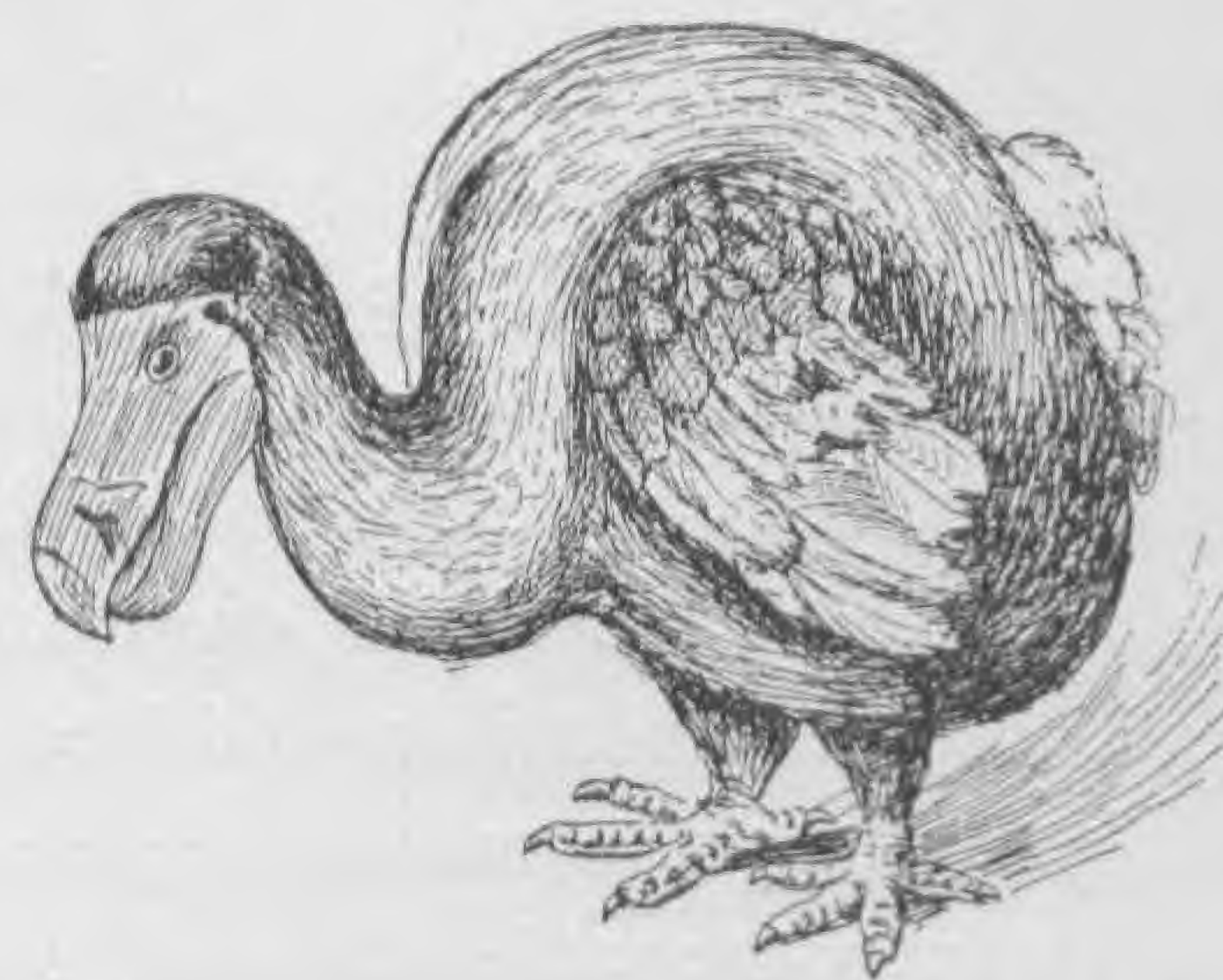
high mountain, and that he has two large lizards for a guard. Man lived here before the moa died out, for ashes and charred wood are found with moa bones in such a way as to show that it was used as food. To say that the moa was killed by the coming on of glacial conditions would not mean as great an antiquity in New Zealand as with us, for it is probable that the Southern Hemisphere is now almost in a Glacial Period condition.

When the moa lived, however, New Zealand had a rather remarkable group of interesting birds. Besides various species of moa there was the giant harpagornis, a bird of prey of such size that the moa may have been one of its victims, and the cnemiornis, a giant goose.

The great auk, the æpiornis, dodo, moas and other birds have died out, some on account of the introduction by man of hostile animals, some by man's own attacks, some by the burning over of the country by man's fires, others by a change of climate. These illustrate some ways by which a species of animal may become extinct.

Let us look at a few causes of extinction in geological history. First, a change of climate. Suppose a climate gradually becomes colder, some animals will be killed outright; others may by moving from their old homes find new and warmer locations; others may still remain in their old haunts and on account of stronger constitutions may survive. These latter will gradually become adapted to their surroundings by growing thicker coats of hair and by other changes

that may be helpful. If a climate became warmer plants and animals from warmer parts of the world might move in; those preferring a colder home would migrate, and the types that remained might grow less hairy or woolly and better adapted to the new conditions. The ancestor of the hairy mammoth and the hairless elephant may have been one beast. In any great change



THE DODO.

of climate thus many types would die out and others would be so changed as to be called by new names.

Changes of level may destroy species of animals. Take an example from sea life. Many types are suited to life in shallow waters just below low tide. A slow elevation or depression of the coast will drive them to seek new homes, to change, or to die out.

Another most important cause of extinction is the introduction of new and hostile life-forms

into a district occupied by weaker types. To show my meaning: our native American flowers are in many places disappearing, being crowded out by the strong European weeds, seeds of which are brought hither every year in

many curious ways. The

English sparrow in some neighborhoods

bids fair to drive

out our native song birds. The

domestic animals of the

whites killed out the dodo. To

suppose a case entirely geological in character:

if Australia were connected with

Asia by a strip

of land the tigers and other carnivorous

animals of the greater continent would crowd in and the kangaroo and other old-fashioned animals of that remarkable land would have been killed off by these new and fiercer forms.

A curious possible method of extinction is suggested by the mutual dependence that exists between some animals and plants. When you come to study botany you will learn that many plants depend upon insects to help them in producing seed. Red clover cannot be made to grow and bear seed in New Zealand unless the kind of bee that aids it is taken along also. Many plants would become extinct if by any

misadventure their insect friends were to die. The loss of any one species of animals or plant may affect the well being of others.

These causes mentioned are wide-spread or general in their action and affect a whole species. Of course local extinctions are common geological events. Thus an earthquake shock may cause the drying of a bog or pond and the death of all its aquatic forms. A volcanic eruption may bare a landscape and cause widespread animal death. A flood may be locally fatal. Such causes kill individual animals, not often a whole species. These various causes both local and general have been in operation since life first appeared on the globe and have in the earth's history swept off form after form, so that great differences are seen in the life of the globe at different times.

One more point. The queer old birds, moas, dodos, and æpiornis were all island forms. To the geologist island life is most interesting. There was a time when great bird-life was more conspicuous than now. Then these islands were connected with the mainland. Geographical changes came on and these were separated. In the continents great changes of climate and surroundings and new enemies did away with many of the old forms and compelled many others to change. So the life on the continents moved on. But in these sea-bound islands climates were fixed, new forms were kept away by the water-barrier and the old types changed slowly and lingered on. For this reason old islands are full of quaint and ancient life-forms. Look at Australia, the island continent! Its life is that of ages back. Duckbill, kangaroo, wombat, the lung fish and Port Jackson shark, the quaint old-fashioned flora are such as in Asia and elsewhere disappeared long since. Here, shut off from foes, isolated, the old types have lived on. Mauritius, Madagascar, New Zealand tell the same story. "To keep up with the times," a district of country, like a man, must retain connection with the rest of the world.

So much for birds—"the Runners and Fliers." Some in geology present us strange reptilian forms; others tell us the story of extinction with its causes and present us the interesting problem of "Island Life."

Frederick Starr.



THE MOA.

TOM'S UNLUCKY FANCY.

OUR Tom was as gay and merry a wight
 As you ever would wish to see :
 He raced and frolicked from morning till night,
 As happy as boy could be ;
 And Tom had a fancy vivid and gay
 That indulged in many an art,
 And he thought the very best kind of a play
 Was to play he was "acting a part."

Sometimes as a gallant knight and bold
 He fought with the cornstalks tall ;
 Sometimes as a pirate he sailed for gold ;
 As a robber he scaled the wall.
 And oft as a young fay blithe and gay
 He roved through dell and glade ;
 He was Robin Hood, or a pilgrim good ;
 Or the beau on the grand parade.

Well, one fine day, as the wheat field lay
 All yellow and ripe in the sun,
 Tom racked his brain for a brand-new play,
 And a novel kind of fun ;
 He thought of Joseph's brethren of old,

And the famine that urged their feet,
 And he seized a stick and with footsteps bold
 He marched through the waving wheat.

As his course he took he thought not to look
 For an eye that might seem unkind,
 So he did not heed, as he went with speed,
 That his father was close behind,
 But with sturdy blows that fell and rose,
 He leveled the yellow grain,
 And — "Here goes a young man reaping in
 Egypt!"
 He shouted in glad refrain.

At last 'mid the ranks of fallen wheat
 He came to a sudden stand,
 As his father approached with footsteps fleet,
 And a birch rod in his hand ;
 And these were the words that made Tom
 quiver,
 And woke a throb in his breast :
 "Here comes an old man thrashing in Egypt" —
 I'll leave you to guess the rest.

Anna R. Henderson.

THE OTTOMAN TURKS, 1300-1800.

(Search-Questions in Mahometan History.)

141. When and by whom was the Ottoman empire founded?

142. When did the Turks first gain permanent foothold in Europe?

143. What European city captured by the Turks was for a century following the capital of their European dominions?

144. What Ottoman ruler first bore the title of Sultan?

145. After his victory over Sigismund of Hungary in 1396, by whom was he defeated and made prisoner, and when?

146. What Christian city in Asia Minor

which had not yielded to the Ottoman power was now stormed and taken by this savage conqueror?

147. What great Moslem victory in 1453 ended the Roman empire in the east?

148. What Italian city was stormed and captured by the Turks in 1480?

149. What Turkish sultan overpowered the Mameluke sultan of Egypt, and when? What is the meaning of the word Mameluke?

150. What great event in the history of the conflict between Christian and Moslem occurred at Vienna on October 14, 1529?

151. What great Mahometan power by her continual warfare with the Ottoman rulers did much to preserve Europe from being entirely overrun by the Turks? What religious difference existed between these two powers?

152. When occurred the first conflict between Turkey and Russia?

153. In what naval battle were the Turks defeated by the combined fleets of five European powers?

154. When and by what Ottoman Sultan was Bagdad besieged and taken for the last time?

155. What great victory over the Turks was gained in Hungary in 1664?

156. What city was taken from Venice by the Turks in 1669 after a siege of nearly twenty-five years?

157. What great loss did the Ottoman power sustain in 1717?

158. What Mahometan sect, sometimes called "The Puritans of Islamism," arose in Arabia about 1750, became a powerful body, enforcing its faith by the sword and was finally overthrown by Mahomet Ali about 1818?

159. In 1774 by the intervention of Russia Crimea was taken from the Ottoman empire and became an independent province. How long afterwards was that province annexed to Russia?

160. Where and by whom were the Turks defeated in July, 1799?

Holy City created a strong desire to free Palestine from the Mahometan rule.

102. Peter the Hermit, a native of Amiens in France.

103. Urban II. at the Council of Clermont.

104. Throughout Europe the idea of a crusade was enthusiastically embraced.

105. Godfrey of Bouillon. The first crusade left France in August, 1096.

106. Nice in Bithynia.

107. Antioch.

108. Jerusalem was captured on July 15, 1099, and in two great massacres which immediately followed almost the entire population was slain.

109. Godfrey of Bouillon, who reigned nearly one year.

110. Baldwin I., brother of Godfrey of Bouillon.

111. Edessa, now called Orfat.

112. It created a desire for a second crusade in order to strengthen the Christian power in the East.

113. By order of Pope Eugenius he preached throughout France and Germany in behalf of another crusade.

114. Damascus.

115. Almeric.

116. Green. This was replaced by the black emblems of the Abbassides.

117. Saladin being now the ruler of Egypt began to consolidate the Moslem power in order to carry out his plan of driving the Christians from the Holy Land.

118. Guy de Lusignan.

119. The defeat of the Christians.

120. Jerusalem surrendered to Saladin October, 1187, on which occasion the inhabitants were treated with great clemency.

Oscar Fay Adams.

ANSWERS TO MAY SEARCH-QUESTIONS.

101. A pilgrimage to Jerusalem was once esteemed a high Christian duty, but the difficulties the pilgrims experienced in passing through Mahometan countries, and the indignities they suffered from the Moslems in the





BREAD-MAKING.

(Cooking in the Public Schools.)



KNEADING.

AS I sit writing there floats in from the pantry beyond the kitchen a sweet girlish voice singing the dear old hymn,

"O mother dear, Jerusalem,"

and as a sort of accompaniment comes a soft thumping sound, that I have learned to know is made by the slipping of the bread-

board on the table, as the fourteen-year-old daughter kneads the dough that she is just setting for to-morrow morning's baking.

She took the task of making the family bread during one of the domestic emergencies that occur in every family, and she has kept it for three months, until she is an accomplished bread-maker, and enjoys her work, not minding it at all, nor considering it a hard task. She does not go to the Public School Cooking Classes because she does not live in Boston; but she has learned to do a good many things, and likes trying experiments. It is odd, isn't it, that I should write this chapter on bread to the accompaniment of the kneading and the little glad song of the maker?

But you and I must run away from the Dedham kitchen and its happy occupant, and find ourselves one of the class in the School Kitchen. It is an important day in the school when bread is to be made. The girls really believe then

that they are genuine cooks. They put on their aprons and caps with greater alacrity than usual, full of the importance of the occasion and anxious to begin.

Of course the rules for yeast and for bread that I am going to give you are the ones in use at the school, and as I have seen and tasted the bread made there, I think them very good. The yeast really used is the compressed yeast that is so universally liked by housekeepers, but as there are liable to be occasions when this yeast is not obtainable, it has been considered wise to teach the pupils to make their own yeast, so they may be able to meet an emergency. Of course this is not at all likely to occur in towns where shops are convenient and one can run out and fill one's household needs at an instant's notice. But if one lives at a distance from stores, it is quite a convenience to have one's own yeast jug to go to whenever bread is to be made. Most housekeepers living on farms and far away from shopping centers keep their own yeast constantly on hand, never allowing themselves to be quite out of it, generally using the last cupful to start the new supply with.

It is not a difficult matter to make the yeast, as you shall see. But first I must tell you that there is a good deal of practical chemistry in this lesson, which you and I must omit as we have not the space for more than the practical working facts. Indeed, there is a scientific reason for everything that is done in practical cooking, some of which I dare say you may have found out for yourself. If you haven't you must manage somehow to get the school-training, and then you will know all about it.

And now for the yeast, made by using the following ingredients in these proportions:

One large potato, one tablespoonful of hops loose, one pint of boiling water, one heaping tablespoonful of flour, one heaping teaspoonful of sugar, one heaping teaspoonful of salt, one quarter of a teaspoonful of ginger, one half a yeast cake dissolved in half a cup of lukewarm water, or one half a cup of yeast. Wash the potato well, pare it and put it in cold water to soak. Steep the hops in the boiling water. Mix the flour, sugar, ginger and salt in a large bowl, then grate the potato into this flour mixture; let the hop-water boil for one minute, then strain it over the potato and flour, and mix it as quickly as possible. If it does not thicken like starch place it over the fire for a few minutes. If it is too thick add boiling water until it is as thick as cream; set it aside to cool, and when it is lukewarm add the yeast. Set in a warm place to rise, until it is frothy and light. Beat it down every half-hour. When it is risen sufficiently put it in a jar or a glass bottle, and keep it cool. When you have to take some of the yeast out do not take the jar into a warm place, but pour it out where it is kept, and mind that the cork is replaced at once.

You will see that the potato is not cooked, but is grated raw. Now many of the rules that are in use in families call for boiled potatoes. I do not suppose that the yeast itself is any better made with the uncooked potatoes, *but it keeps better*. It will sour quicker when the cooked potato is used, just as any cooked vegetables spoil more quickly than the uncooked ones. Perhaps some of you may be able to give your mothers a point just here in regard to yeast-making. It is more trying both to fingers and temper to grate the raw potato than to mash the cooked one, but the result will be better, and that is worth taking a little extra trouble for, isn't it? In fact, my little cooks, you will find as you go along that the trouble taken does repay you, no matter what it is that you are doing. And in nothing does one get so satisfactorily rewarded for the extra care as in cooking. Ask your mother if it isn't so, you little doubter; and you too, who think "it's all nonsense to take such pains; it won't be any better for it." All this will be borne in upon you in the School Kitchen, and you will soon become assured that there is no royal road to anything that is worth

doing, and that learning to cook is very much like all the rest.

But now comes the bread-making, the yeast having been made and bottled. (In regard to the respective merits of the yeasts: in general results they are the same, but it must be acknowledged that the compressed yeast makes the bread finer and whiter than the home-made yeast does, but it is no sweeter, nor has it a better flavor.) The rule here given will make either one loaf of bread or a pan of biscuits. You increase the rule as you desire a larger quantity. Use one cup of milk or water, lukewarm, one half a teaspoonful of salt, one half a teaspoonful of sugar, one quarter of a cup of yeast, or one quarter of a yeast cake dissolved in one quarter of a cup of water, and from three to three and a half cups of flour. If you use milk you must heat it to boiling in the double heater; mere scalding will not do; it must be boiled; the bread will keep better, and the dough will not turn sour in rising, as it often will do in warm weather, even when great care is exercised. But the School Kitchen girls are taught to raise their bread dough with water. Sift the flour into the mixing bowl, which should be of earthen ware, as this holds the heat better than tin, and makes the bread rise more quickly. Mix the salt, sugar and yeast, then add the milk or water, and pour into the bowl which holds the flour; mix it thoroughly with a knife, and then, when it is well mixed, and is stiff enough to knead, turn it out on to a well-floured board, and knead it until it is soft and elastic and can be worked without any flour. You need not make hard work of the kneading; it is lightness and quickness of touch rather than an expenditure of strength which is required. What is wanted is to get it well-mixed, so that every particle shall be permeated with the yeast, and the whole mass shall be perfectly smooth and free from lumps.

I once had a cook who was trying to teach the second girl to make bread. She said to me one day, after we had been treated to some bread of the pupil's making that was far below the standard: "Indeed, ma'am, and it's no use trying to teach Nellie to make bread, she cannot do it; she is too heavy-handed; she'll never make a cook."

I didn't quite see what Maggie meant, but I found out by watching. The girl moved heavily; she touched things as though her hand was of iron; she clutched rather than held; there was no lightness, nor alertness to any of her movements. She was hopelessly "heavy," and her hands spoiled the bread rather than lightened it. I have seen a few people like her since, and I have found out in every case that they were not good cooks. No matter how hard they tried, they could not succeed. It was in the hopeless heaviness of their movements. Now all this won't be taught you in the cooking school, because there it is the duty of the teacher to make the pupils do things, and never let them think they cannot. But I give you this information, coming out of my own experience, and it will perhaps assist you in time to come when it shall fall to your lot to look for the new servant girl.

The bread has been "put to rise" in the bowl, neatly covered with a clean bread cloth, with a pan closely put over it to keep out the air, so that a crust may not form on the outside, but that the whole mass may be kept soft. The lesson for the day is over. We are to come again to attend to the baking.

We left our bread in a warm, sheltered place, where it should be subject to no sudden change of temperature, and we have come again to find it beautifully risen, ready to make into loaf or biscuit. When well-risen it should be double its original bulk; work it over in the bowl,

doubling it from the edges toward the center until it is smooth, let it rise again, which it will do quickly, until it is double its bulk, then shape into loaves and set to rise closely covered, in the pans in which it is to be baked. Let it rise until it is light, then bake in a hot oven, or one so hot that you can hold the hand in twelve seconds without getting too hot. If you have a cooking thermometer, which, by the way, very few do have, it should register four hundred degrees. In the beginning you will have to take counsel with some one older than yourself, to whom bread-baking is not a novelty.

Have any of you ever had anything to do with those exasperating people, who, when asked for any instruction, always say "use your own judgment"? Aren't they provoking? Why, how is the novice in anything to have any judgment to use? What is "judgment," but the outcome of experience? Knowledge of any kind doesn't come by intuition; it is the result of repeated experiment. Now the next time any one tells you to "use your judgment," when you ask them how long to bake the loaf, or how hot to have the oven, or how much baking-powder to put into the muffins — get them to define judgment for you, and then ask them very respectfully how you have had time or opportunity to acquire it.

In the meantime bake your bread from forty to sixty minutes; see that it properly browns, a lovely golden color, and that it has a hollow sound when you thump it with your knuckle.

Sallie Joy White.

A WILD-FLOWER BOOK.

(Vacation-work, for Christmas, Easter and Birthday Gifts.)

WHAT is a wild-flower book?" perhaps you will ask.

Let me answer in part by asking if you have ever seen one of those pretty souvenir volumes shaped like an autograph album, long and narrow, labeled "Wild Flowers of Colorado"? Two of them lie before me; one considered a most beautiful thing until the other came; for

that, superlative or super-beautiful was the only word to fit. The first has sixty specimens; arranged singly or in groups on the right-hand pages; in the choicer one there is but one on a page, and the effect is like a hand-painting in water colors; more attractive than Christmas cards, because the real flower, in its own colors, instead of a representation.

Each is placed on the page in as natural a way as if it had just been laid down and left to its own graceful lines and curves, and the colors are fresh and life-like. They are the flowers that H. H. wrote so rapturously about; columbine, syringa, coreopsis, potentilla, the amaranth colored prairie clover, dainty meadow rue, the wonderful shooting star, candy-tuft and silia and saxifrage and mallows and corydalis, pentstemon and daisy and anemone, and evening primrose and clematis, spirea and gentian, wild rose and geranium, the delicate mountain lily, and the Mariposa lily of California and Colorado stories, "everlastings" almost as elegant as the edelweiss, ferns and grasses, and a sprig of kinnikinnick such as her grave is covered with.

These are kept in place by tiny straps of gold or silver paper, sometimes one, sometimes the other, fastened over the stem here and there with mucilage. In a corner of the page is written inconspicuously the colloquial and the botanical names of the flower, the date, and place where found—as "Alpine Pink, *silene acaulis*, summit Pike's Peak, July 4, 1884"; and "*Saxifraga bronchialis*, Mt. Cutler, Cheyenne Cañon, 7000 ft., June 24, 1884."

A charming gift for a friend, you will say; for one who likes mementoes of places or who can appreciate flowers or who has a taste for botany, or who is in any degree poetic or artistic, or even to a moderate extent has enthusiasm over such things (if moderation and enthusiasm can be used in connection), or has a bit the element of the picturesque.

"Wild-flowers" may be a flexible word in this use, and may be generic for all beautiful growing things; may mean ferns, grasses, wood-mosses, sea-mosses, even leaves. You can make a book of beauty with any of these materials. Wherever you may go, in the country or by the seashore, there are lovely things to be had for the gathering. Even on Appledore, that ledgy island of the Isles of Shoals group, a young girl collected during a day's sojourn flowers enough to make a book, one page of which was as beautiful as a painting with sprays of the tiny scarlet pimpernel. Another, who had earned a two or three days' vacation, on an excursion trip to the White Mountains, secured

sandworts from the high altitudes, harebells from the Notch, buttercups from the tiny lawn in front of the Willey House, with grasses and ferns, to make into a Christmas book for her most fastidious friend.

Grasses, let me assure you, are not to be despised. Darwin was rapturous over the discovery of one grass, or the ability to identify it. Some of the most common specimens in any field or by any roadside are exquisite, and when pressed are like the daintiest of pencil sketches, in such purplish and gray-green tints and tones as no artist can find among his possibilities of color.

A book of any of these—flowers, mosses, ferns, grasses—may be a delightful reminder of a sojourn among the hills, of pleasant saunterings during vacation time. The suggestion may be followed out in unnumbered ways; like, for instance, that of a New England girl, who while thinking over what would be a suitable thing within her very small means to send to a friend in the West for a Christmas present, happened to think that that far-away lady had an intense fondness for every wild flower she had been accustomed to in her childhood in her Green Mountain home. So she went at once to work, making a collection of buttercups and daisies and the common wild things of the woods and meadows, ferns, and grasses, tiny vines and sprays; pressed them with care; made a book from choice unruled note paper with a decorated cover of her own fashioning and ornamenting, had it nicely labeled, "*Wild Flowers from Dorset*." She wrote against the group of buttercups, "from the upland orchard"; against some daisies, "from the white field"; against some yellow clover blossoms, "from cuckoo hollow," and so on. They were the old, familiar places—"Uncle Ben's orchard," "shady lane," "the colt pasture," "meadow brook," "Potter's woods," "the sand bank"—names associated with the days this emigrant had spent with her schoolmates, going a-berrying, after wild flowers, and on those rambles country children love. And this cultivated, elderly woman said that the home-y gift was the most precious thing she received at that Christmas-tide.

Amanda B. Harris.

THE GREAT MOGUL.

(Stories about Famous Precious Stones.)

IF the Sanci be the Sphinx of diamonds the Great Mogul may not inaptly be called the Meteor among them. Like those brilliant visitants in the skies, it flashes suddenly upon us in all its splendor and as suddenly disappears in total darkness leaving not a trace behind. So utterly has it vanished from our ken that some writers deny its independent existence. And this they do in the face of the minute description of the greatest diamond-merchant and expert of his century, who actually held the stone in his hand! The hard-headed practical Tavernier was not likely to have dreamed that he saw the Great Mogul, nor is it likely that a diamond-merchant of his experience could have made any gross mistake as to its weight or its character—for some go so far as to suggest that the Great Mogul was a white topaz! The fact that we now cannot find the diamond is no sufficient reason for denying its former existence.

In the account of Queen Victoria's diamond, the Koh-i-nûr, we made acquaintance with the court of Delhi; to its complicated records we must return for the Great Mogul. It is scarcely needful to state this name is a fanciful one bestowed on the lost gem by European writers; Tavernier gives it no distinct name in his description.

Shah Jehan (Lord of the World) who reigned in the middle of the seventeenth century was, as we have already seen, the husband of the beautiful Nûr Jehan (Light of the World) who bore him four sons and two daughters.

As the King grew older his sons grew stronger, and fearing that they would not be able to dwell together in amity at Delhi the old monarch gave distant governments to three of his sons, in order to keep the young men apart from one another, and at a safe distance from himself. In this way he vainly hoped to escape the destiny of Indian emperors—jealousies and mutinies during his life and fratricides after his death. But his plan failed. Shah Jehan saw one son put a brother to death and he himself lived for seven-years as the captive of the murderer.

A contemporary of Shah Jehan was Emir Jemla, or Mirgimola, as Tavernier calls him. He was a man of great ability and singular fortunes, being, so to speak, the Cardinal Wolsey of his king Abdullah Kutb Shah, lord of Golconda. Proud, ambitious, skillful and rich, he at length aroused the suspicions of his sovereign, as was the case with regard to Wolsey. Emir Jemla was not, however, a priest, but a soldier, and commanded the King's armies. A Persian by birth and of mean origin, he had raised himself to be general-in-chief by means of his military talents and his vast wealth. Emir Jemla sent ships into many countries, says Tavernier, and worked diamond-mines under an assumed name, so that people discoursed of nothing but of the riches of Emir Jemla. His diamonds, moreover, he counted by the sackful.

In the year 1656, being sent by the King to bring certain rebellious rajahs to reason, he left as hostages in his master's hands his wife and children, according to the usual practice among the suspicious and not over-faithful Asiatics. While he was absent upon this expedition the King's mind was poisoned against the powerful favorite by the courtiers jealous of his success. Having only daughters, the King was made to believe that Emir Jemla intended to raise his own son to the throne, and the unruly, ill-mannered behavior of this son lent color to the tale. The King took fright at the idea and laid hands upon the hostages using them sharply. The son sent word to his father, Emir Jemla, and the latter enraged at the indignity resolved to avenge himself. He invoked the aid of the imperial suzerain, Shah Jehan. Uncertain of his success at headquarters, he applied in the meantime to two of the Emperor's sons who were nearer at hand than far-off Delhi, for they were then at the head of their respective governments to the north and west of Golconda. One of them refused Emir Jemla's offer of adding his master's dominions to the empire of Shah Jehan in return for the loan of an army, but the other accepted the

proposition. The name of him who accepted was Aurungzeb, third son of Shah Jehan, and the most perfidious prince within the four corners of India.

The allied chiefs did not waste time, but arrived before Golconda so unexpectedly that Abdullah had barely time to save himself by retiring to his not far-distant hill-fortress. Indeed the King himself threw open his gates to the enemy, for Aurungzeb gave out that he came as ambassador from the emperor Shah Jehan, and the King was within a hair-breadth of falling into the hands of the treacherous ambassador when he received timely warning and saved himself by flight. With a courtesy which Tavernier finds passing graceful the fugitive King sent back to his rebel vassal the wife and children whom he had held as hostages. Notwithstanding their war there remained a good deal of kindly feeling between Emir Jemla and the King, his master. For example: one day his Majesty being straitly besieged in his fortress was informed by his Dutch cannonier that Emir Jemla was riding within range. "Shall I take off his head for your Highness?" asked the Dutchman. The King, very wroth, replied: "No; learn that not so lightly is esteemed the life of a prince." The cannonier, not to be balked of his artillery practice, cut in twain the body of a general who was riding not far from Emir Jemla.

On his side also Emir Jemla was anxious not to reduce the King to extremities and refused to prosecute the siege to the uttermost, which much disgusted his ally Aurungzeb. Rather he would treat with his ancient master, who gladly accepted the chance of deliverance, appealing to Shah Jehan himself against his son. The emperor was easy on his former ally, and eventually a family alliance was arranged between a daughter of King Abdullah and a son of Aurungzeb. Emir Jemla set off to Delhi to confer with Shah Jehan upon the subject.

It is an axiom of Asiatic etiquette that no one ever comes before a king without laying a gift at his feet. Emir Jemla, anxious to obtain the favor of Shah Jehan, took care not to stand before him empty-handed, but presented him with "that celebrated diamond which has been generally deemed unparalleled in size and

beauty." So says François Bernier, a Frenchman, physician to Aurungzeb, who lived many years in Delhi and whose familiarity with the court enabled him to speak accurately of recent occurrences.

After Emir Jemla had presented his matchless diamond to Shah Jehan, who was a man of taste in gems, he gave the Emperor to understand that the diamonds of Golconda were quite other things from "those rocks of Kandahar," which he had seen hitherto. This was a rather contemptuous phrase to use to an emperor who already possessed the Koh-i-nûr. However, the stone which Emir Jemla gave to Shah Jehan so far exceeded everything that had been hitherto dreamed of in the way of diamonds that he might be excused if he exaggerated somewhat.

It will be well here to quote Tavernier's account of the Great Mogul diamond, even though something out of the chronological order. The occasion is Tavernier's departure from Delhi on his sixth and last return from India to Europe.

"The first of November, 1665, I was at the Palace to take leave of the King (Aurungzeb) but he said I must not go without seeing his jewels since I had seen the magnificence of his fête. Next morning very early five or six officers came from the king and others from the Nabob Jafer Khan, to say the king was waiting for me. As soon as I arrived the two courtiers who had charge of the jewels accompanied me to his Majesty, and after the customary salutations they took me into a small chamber situated at the end of the hall where the king was sitting on his throne, and whence he could see us. I found in this chamber Akel Khan, the chief keeper of the jewels, who as soon as he saw me commanded the four eunuchs of the king to go and fetch the jewels which were brought on two wooden trays lacquered with gold-leaf, and covered with cloths made on purpose, one of red velvet and one of green velvet embroidered. After they were uncovered and had been counted, each piece two or three times, a list was drawn up by the three scribes present. Indians do all things with much care and deliberation, and when they see any one acting with precipitation or getting angry they look upon it as a thing to laugh at.

"The first piece which Akel Khan put into my hands was the great diamond which is a round rose, cut very high on one side. On the lower edge there is a slight crack and a little flaw in it. Its water is beautiful and it weighs 319 1-2 ratis which make 280 of our carats, the ratis being 7-8 of our carat. When Mergimola (*i. e.* Emir Jemla) who betrayed the king of Golconda, his master, made present of this stone to Shah Jehan to whose court he retired, it was rough, and weighed then 900 ratis which make 787 1-2 carats, and there were several flaws in it.

If this stone had been in Europe it would have been differently treated, for several good slices would have been taken off, and it would have remained heavier, instead of which it has been entirely ground down. It was Hortensio Borgis, a Venetian, who cut it, for which he was sufficiently badly recompensed, for when it was seen, he was reproached with having ruined the stone, which should have remained heavier, and instead of paying him for his work, the king fined him ten thousand rupees and would have taken more if he had possessed it. If Sieur Hortensio had understood his business well he would have been able to get several good pieces from this stone without doing any wrong to the King, and without having the trouble of grinding it down, but he was an unskillful diamond-cutter."

Tavernier held this great stone in his hand for some time and contemplated it at his leisure. It must have been a great day for him, the connoisseur, to see and examine the finest diamond in existence. It is well he looked long and keenly at it, for it was never again to be seen by European eyes. On this second of November, 1665, the Great Mogul was seen for the first, last and only time by one able to tell us anything about it. This was its meteor-flash into history and fame. It was seen by the man best able to appreciate it and then never seen again. The accompanying illustration is taken from Tavernier's drawing of the Great Mogul.

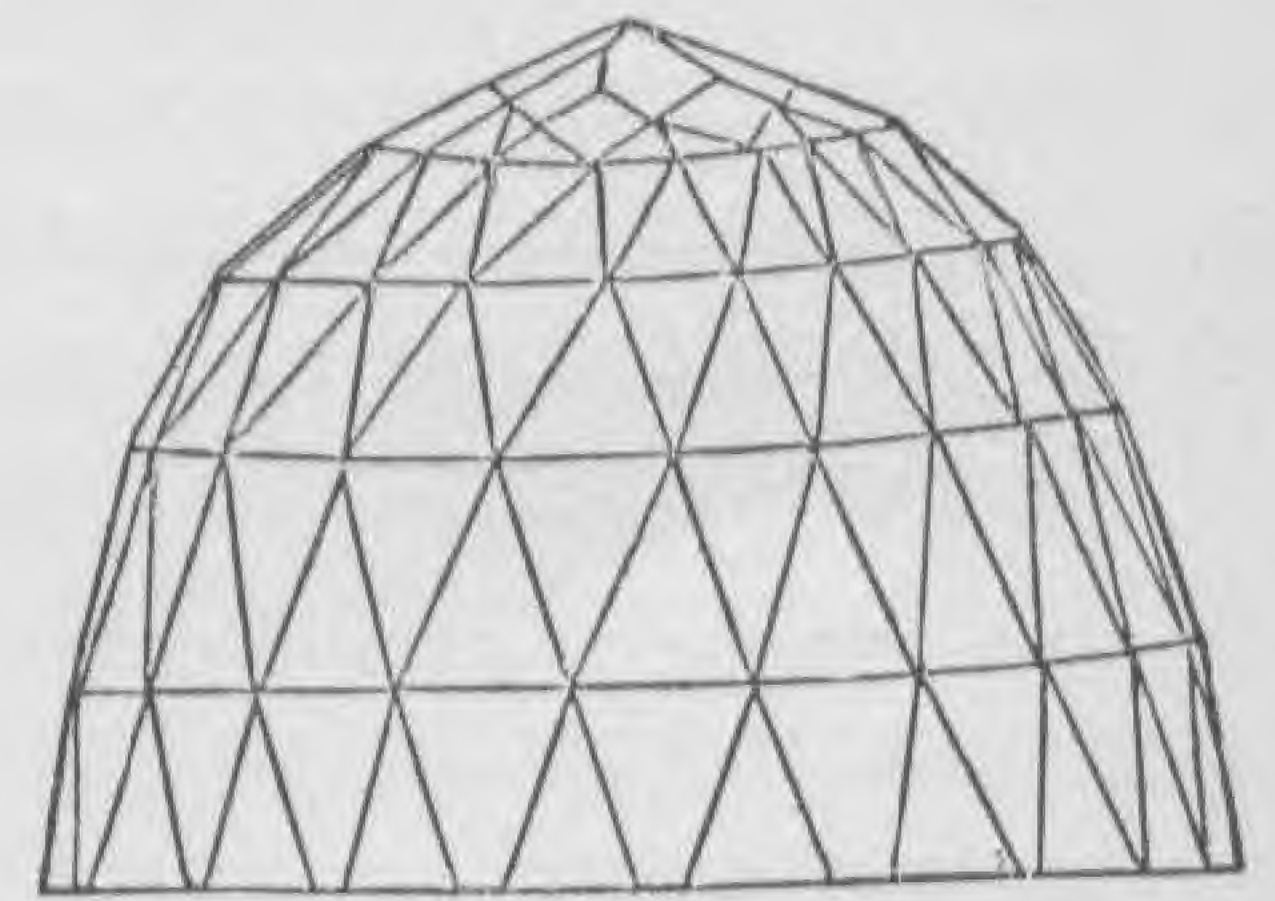
Incidentally we learn something more of the monster diamond from the pen of the same writer. Speaking of the Coulour or Gani diamond-mine, Tavernier says:

"There are still found there large stones, larger than elsewhere, from ten to forty carats and sometimes larger, among them the great diamond which weighed nine hundred carats (an evident slip for ratis) before being cut, which Mirgimola presented to Aurungzeb) another slip for Shah Jehan) as I have said before."

To explain these slips of Tavernier's pen it will be well to state that the great Frenchman, though speaking all European and many Asiatic languages, was yet unable to write in any, not even in his own. He therefore borrowed the pens of two different persons to write his delightful travels which give us such a living picture of Indian life two centuries ago. The Coulour mine, here spoken of, was discovered about a century before Tavernier's time, in a very singular manner. A peasant when preparing the

ground to sow millet, unearthed a sparkling pebble which excited his attention. Golconda was near enough for him to have heard of diamonds, so he brought his prize to a merchant at the latter place. The merchant was amazed to see in the peasant's pebble a very large diamond. The fame of Coulour quickly spread, and it soon became a great mining center, employing thousands of workmen. Tavernier objects that the mine yielded stones of impure water. The gems, he declares, seemed to partake of the nature of the soil and tended to a greenish, a reddish, or a yellowish hue as the case might be.

This defect was not apparent in the Great Mogul which was, he distinctly says, perfect, of good water and of good form, having but one little flaw on the lowest edge. Taking this flaw into consideration, the value of the diamond, according to Tavernier's scale of estimation, was 11,723,278 livres, which being reduced to present coinage yields the goodly sum of \$2,344,655. Permission being given to weigh the gem, he found the exact weight to be 279 9-16 carats.



THE GREAT MOGUL.

Then after looking at the diamond as long as he wanted, for Akel Khan did in no wise hurry him, Tavernier was shown a multitude of other gems of lesser note, and among them a pearl perfectly round, weighing thirty-six and one half ratis, of beautiful lustre, white, and perfect in every way.

"This is the only jewel which Aurungzeb who reigns now has bought on account of its beauty, for all the others came to him in part from Dara, his eldest brother, to whose belongings he succeeded after having cut off his head, and in part from presents from his nobles."

This slight remark opens to our view one of the saddest chapters of the gloomy family history of Shah Jehan's sons. And as Dara was once the possessor of the Great Mogul, we may be allowed to give his pitiful story in a few words.

Prince Dara (David) the eldest son of Shah Jehan and the Light of the World, was destined

by his father to succeed him on the throne of Delhi. Having, as we have already seen, disposed of his other three sons in the furthest corners of India, the old king thought he was safe. But one of those sons, Aurungzeb, was a man of restless ambition. Not content with his appointed province of the Deccan, Aurungzeb pretended to the imperial crown itself. In 1657 Shah Jehan fell sick, and Aurungzeb, attended by a large army, which included a contingent under Emir Jemla's command, hastened toward Delhi. The aged emperor, dreading the filial solicitude which arrayed itself in so formidable a manner, sent orders to his son to return to his province. Aurungzeb not only did not return, but persuaded another brother to come up from his province, likewise attended by an army, and together they marched upon their father's capital. The course of Asiatic intrigue is too complicated and subtle for any but the merest antiquary to track it. Suffice it to say that after much lying and many protestations of obedience, matters came to a crisis, and Dara was sent by Shah Jehan to oppose Aurungzeb by force.

Dara was overthrown and returned humiliated to his father's palace. Recollecting that his own path to the throne lay through the blood of his nearest relatives, Shah Jehan, no longer able to defend his eldest son against the undutiful Aurungzeb, gave him two elephant-loads of gold and jewels, and bade him escape. The Great Mogul diamond was apparently among the jewels thus despairingly bestowed upon his son by the enfeebled old king. At all events Dara escaped and fled from friend to friend for the space of one year, and it was during this time that he was seen by Bernier, the famous French surgeon, who was afterwards attached to the service of Aurungzeb.

Meantime that successful traitor dethroned and then imprisoned his father, whose grandiloquent title of Shah Jehan (Lord of the World) became a bitter mockery when designating the prisoner of Agra, and then he awaited the treachery of some of Dara's so-called friends. In the course of a twelvemonth, his patience was rewarded. The chief of Jun, who had reason to be grateful for many favors from Dara, gained an infamous notoriety by delivering the fugitive prince over to his usurping brother.

Aurungzeb caused Prince Dara to be publicly paraded through the streets of Delhi with his little seven-year-old grandson by his side, while the executioner stood ominously behind him. This pitiful spectacle was witnessed by all Delhi, and many tears were shed over the fall of Dara, but "no one raised a hand to aid him," remarks Bernier, who was one of the spectators. After a mock trial the unhappy prince was sentenced to death, and a slave with several satellites was sent to the prison of Gevalior to dispatch him. Dara was engaged in cooking some lentils for himself and his little grandson, for this was the only food he would touch, lest they should be secretly poisoned. The moment the slaves entered, he cried out, "Behold, my son, those who are come to slay us!" and snatching up a small knife he tried to defend himself and the child. It was an unequal fight which could but end in one way. The boy was quickly made an end of, and Dara being thrown down was held by the legs while one of the slaves cut off his head. The head was then immediately brought to Aurungzeb, as a certificate that his orders had been duly executed. The king desired the face to be washed and wiped in his presence and then, when he saw that it was the veritable head of Dara, his brother, he fell a-weeping and cried aloud: "O, Dara! O, unhappy man! Take it away! Bury it in the tomb of Humaiyun."

Such was the fate of Dara, the second owner of the Great Mogul.

In conclusion Tavernier says of the treasures belonging to Aurungzeb:

"These then are the jewels of the Grand Mogul which he showed to me by a particular grace granted to no other foreigner, and I held them all in my hand and considered them with so much attention and leisure that I can assure the reader that the description which I have given is very exact and faithful, as also of the stones which I had time enough to contemplate."

Here absolutely ends the history of this magnificent gem. What became of it no one knows. Whether it was lost in the sack of Delhi, or carried off by Nadir Shah along with the Koh-i-nûr, it is impossible to say, or even to conjecture with any degree of plausibility. No account of this grand diamond, however, would be complete

without some reference to the extraordinary myths which have gathered around it. There is scarcely another large diamond of no matter what size, or what color, or what shape, that has not sometime, or by somebody, been declared to be the Great Mogul. Its subsequent history seems to be the happy hunting-ground of the foolish theories of writers on precious stones. Men who write carefully enough about other diamonds, launch out into the wildest conjectures about the Great Mogul. They apparently cannot bear the thought of losing so precious a gem and therefore they find it somewhere, no matter to what inconsistency and absurdity they may be reduced in the process of identification.

Take a few examples.

It has been maintained that the Great Mogul is the Orloff; that it is the Koh-i-nûr; that it is both together; that it is the Orloff, the Koh-i-nûr and a third beside, now lost, which Hortenzio Borgis obtained by cleavage—the precise thing which Tavernier distinctly says he did not do, preferring to grind it down; that it was not a diamond at all, but a white topaz—as if Tavernier, the greatest expert of his times, would not have detected that fact. Even Mr. Streeter,

in general a most reliable authority on diamonds, is dazzled into inconsistency when he comes to treat of the Great Mogul. In his work, *Precious Stones and Gems*, published in 1877, he says under the head of celebrated diamonds: “The diamond known as the Great Mogul has received an amount of attention beyond any other. *Under the name of the Koh-i-nûr (Mountain of Light)* it played an important part in the Exhibition of 1851,” etc., etc. Now harken to Mr. Streeter writing in 1882: “If this description (Tavernier’s) be compared with the models both of the Koh-i-nûr and of the Great Mogul itself in our possession, all doubts will be at once removed as to the essentially different character of the two crystals.” Again: “The two differ absolutely in their origin, history, size and form!” The Mr. Streeter of 1882 is wisely ignorant of the lucubrations of the Mr. Streeter of 1877.

Unable to offer the slightest hint as to the fate of the Great Mogul we can only hope that some future day may reveal it, and until then we must put up with our ignorance as best we may. It came and went in a flash of glory, the Meteor of Diamonds.

Mrs. Goddard Orpen.

ABOUT ROW-BOATS.

(Ways To Do Things.)

ROWING is a jolly art, and a common one, and you may pick up so many finishing points from the great professional oarsmen of our day, that we will talk of nothing but its rudiments here. You know that every stroke ought to be taken with the back firm, the knees well apart, the elbows close to the sides, the feet braced, and the eyes set directly forward (which is really backward) and toward the stern. Throw the oar far back, and take care that it does not go deep. Nothing is worse than to see an oar dipped deep and then tossed high; it is ungraceful, unscientific, and a waste of force. A slight but firm depression of the wrists will make short work of this radically bad habit.

If the blade, as it cuts its way below, makes a line almost level with the surface of the water and very close to it, and on swinging through the air back to position makes another close and nearly parallel line that, whatever its modifications or extras, is the perfect stroke. The pull comes in the beginning of a stroke, but it must not be too much of a jerk. The oar’s movement through the water, whether it be slow or swift, should always be longer than the oar’s other movement through the air. And in all there must be no dawdling, no hurry, no splash. The college crews row after several fashions, and the best proof that there is an equal choice of manner, is that the victory varies with the men,

and that nobody knows, any year, what circumstances will combine to give the lucky ones their luck.

Feathering, which is just scraping or tickling the water with the broad underside of the oar so that the spray flies, is a luxury in rowing, not to be tried save on smooth water when nobody is in a very great rush. But in a time of big waves or wind we have to try instead a quick strong beat, steady as a clock's tick, and leave our elegant accomplishments behind us.

Rowing, after all, is not the whole business. Boys and girls are no good marines who can only row. They should know how to manage every mood of their little craft, to launch and moor her neatly and carefully, to steer without a rudder, to turn sharp corners, to tie fast sailor's knots on her ropes, and to keep her so trim and steady that, if necessary, they may move about even in rough weather and change seats without a qualm in the boat's nerves or their own. Where you have a rudder the steering is a pleasant and delicate piece of work, where it pays to be attentive and to keep a strict hand all the time on that wayward fin beneath you. A lax grasp, or a too nervous one, will bring on a bad attack of the wobbles. Fishes, who have their jokes, I suppose, must laugh hard at the crazy zigzag tracks some boats leave on their blue highway. A yacht, a shell, a canoe, and even a row-boat is so clever and beautiful a thing that it deserves that you should devote your whole intelligence to it and love it too much to play any foolhardy tricks with it.

If we study this fine creature, water, it is best to master him outright; for he leads us out of our own country into a foreign place where our very sport is perilous, and where no truce is ever made or kept with mortality. So that there is immense pride and satisfaction in knowing how to keep cool, how to meet an emergency, and how to plan at once the campaign and its tactics — what to do, and when to do it. And the most precious knack of all, the top-feather in a voyager's cap, is swimming, which should be learned beforehand, by right, and which alone can send us abroad with clean breasts.

Nothing but patience and constant practice will teach the thorough handling of a boat.

No amount of devotion to rowing-machines in gymnasiums will do it, though they help afterwards. The way to learn the workings of a row-boat is to work in a row-boat. One good recipe is a quiet river or lake where you may have a roomy seat, a pair of easy oar-locks, and a fair little gondola built of whitewood or cedar and dandified with cushions, nickel and brass nails. The other is an awkward scow, at hap-hazard, on the sea, or on a river like the Piscataqua at Portsmouth, full of strange powerful eddies and currents. If you have your choice of training places it would be excusable and sensible should you prefer the inland route and the civilized wherry, whereas it would certainly be silly and wrong to hunt up a danger for the fun of wrestling with it. But, as in real life ashore, those who have had to rough it young, to fight single-handed against a magnificent enemy, to them arrive the skill and the glory such as no molly-coddle amateur, will he, nill he, can attain.

Rowing is admirable exercise, and means strength to weak arms and breadth to narrow chests, and charities to legs and abdomens as well. Above everything, it brings firmness of nerve. A five-mile row is literally nothing at all, and a twenty-five-mile one a poor thing to brag of, especially if breeze and tide are favorable. But be scrupulous to keep it up no longer than you can do so with absolute ease. When your shoulders droop and twist with the stroke, it is time to play passenger, and to give the oars to a mate.

A parting word, which ought to be the opening one of every enterprise alive, is: Don't be afraid! Carry this for your water-creed — that it is a difficult thing to overturn a boat, and that if you sit square and steady, and act with brains, your boat will do so too; and that chiefly and finally — and it was a noble sailor, Sir Humphrey Gilbert, who said it first — "Heaven is as near by sea as by land." Those of us who are not hanged, according to an agreeable proverb, may be drowned yet; but don't dare to be afraid, again, even of that! Which is a very grim and far-fetched piece of philosophy, but quite as serious as the rest, dear congregation, wherewith to end up this happy-go-easy sermon.

Louise Imogen Guiney.

THE "RINGING ROCKS."

(Geological Talks.)

OUR last trip was up the Delaware from Easton to the Water Gap. Let us now go down the river.

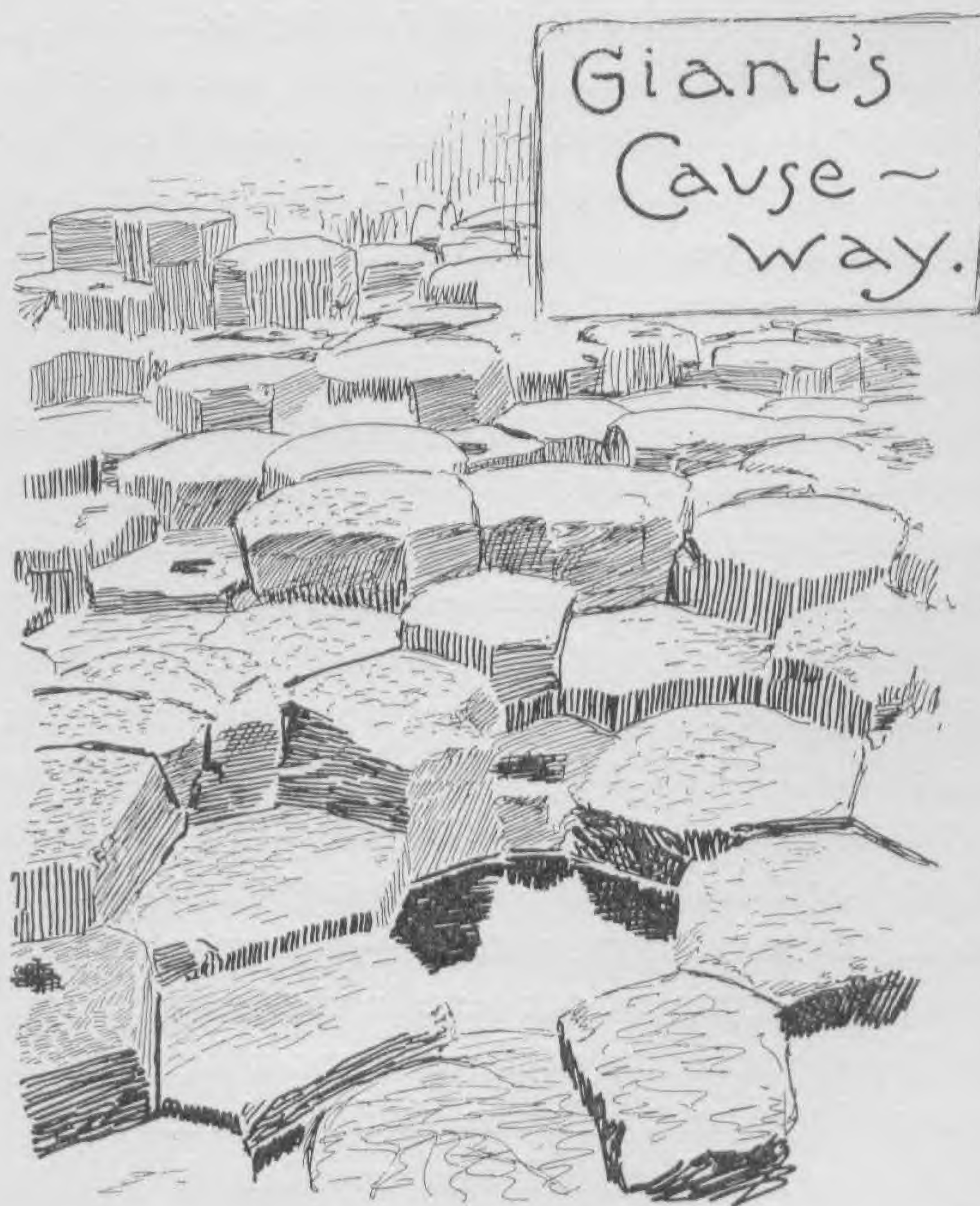
One day late in May four small boys and I started on foot for the Narrows and the Ringing Rocks. All the way we followed the river road, through Raubsville, where the witch-doctor lives, Uhlersville with its old deserted tenement houses, past Durham Furnace with its piles of iron ore and the cavern where some years ago were found interesting fossil bones. On we went through Monroe and at last we began to tire as we came in sight of the "Narrows." We were nearly at the end of our sixteen-mile walk, the day was warm and the canal looked inviting for a bath. What a refreshment to five tired tramps to dive and duck and splash!

Then on we went into the Narrows. The river is narrow here and banks of red sandstone rise in straight-sided cliffs on either side of the river, two hundred feet high. The cliff-sides are cut and gashed with queer little triangular gorges that are full after every rain and then present beautiful little cascades and veils of foam and water. They are dry again in a day almost. At the very foot of the straight-fronted cliff, crowded in between it and the road, is "Aunt Betsey's" little cottage, bright with whitewash on the outside and as neat and clean as soap and water can make it within. One of our number goes in and begs a pie and we all sit down on the canal bank and vote "Aunt Betsey" thanks, and make way with the very best pie she ever made. Then we walked on, picked out "the Great Stone Face" on the cliff-side and finally came to the damp, dripping rock front where grows the little "rose root" or *Sedum rhodiola*, one of the objects of our trip. After clambering around on the cliff we reached the patches and secured what specimens we wanted.

Then we went down to Narrowsville Hotel, took the path for the Summit, and after a stiff climb of a few minutes found ourselves looking

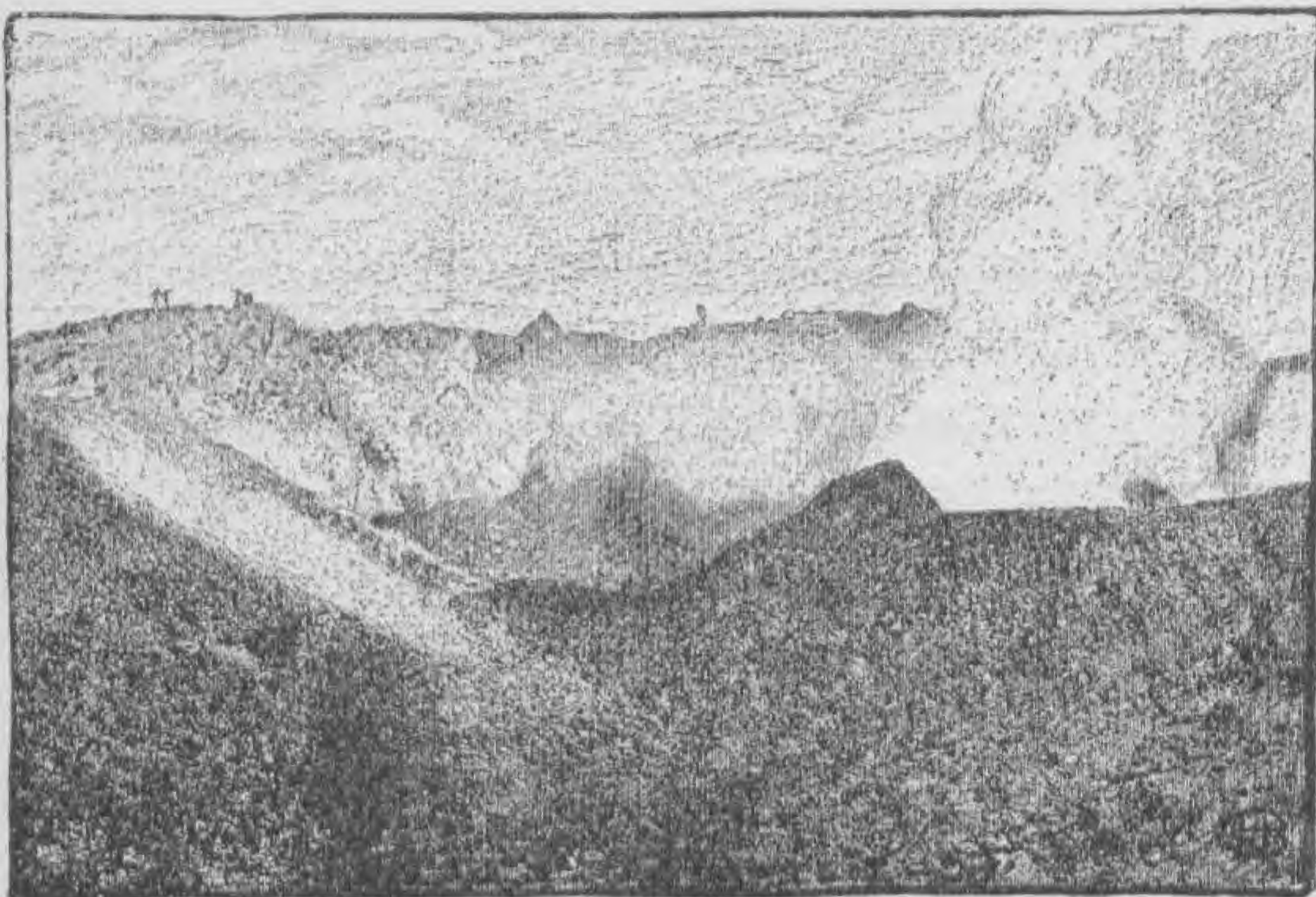
down on one of the most lovely views in this region. Look down here with me, over this straight cliff. Just below us is Aunt Betsey's house, the road, the canal, the winding river beyond, the Jersey hills and rolling farmlands back of that, all dwarfed by distance, so as to look like a painting on a canvas rather than a true scene in nature. Here we eat lunch and try to throw stones into the canal—it looks as if we could drop them down into it—but we cannot. We are not yet done with our tramp however, so we strike back across fields to the "Ringing Rocks."

Here is a space, several acres in extent, of loose rock masses, piled upon one another in the greatest confusion. We have for some time



been passing over red sandstone, but this is very different—close crystalline, heavy, hard and of a dark-green or black color. Where the rain has beaten upon it for years it is a red-

brown color, but this is only skin deep. The rocks are of all sizes from a foot or less across to masses six or eight feet through. Little or



THE CRATER OF VESUVIUS.

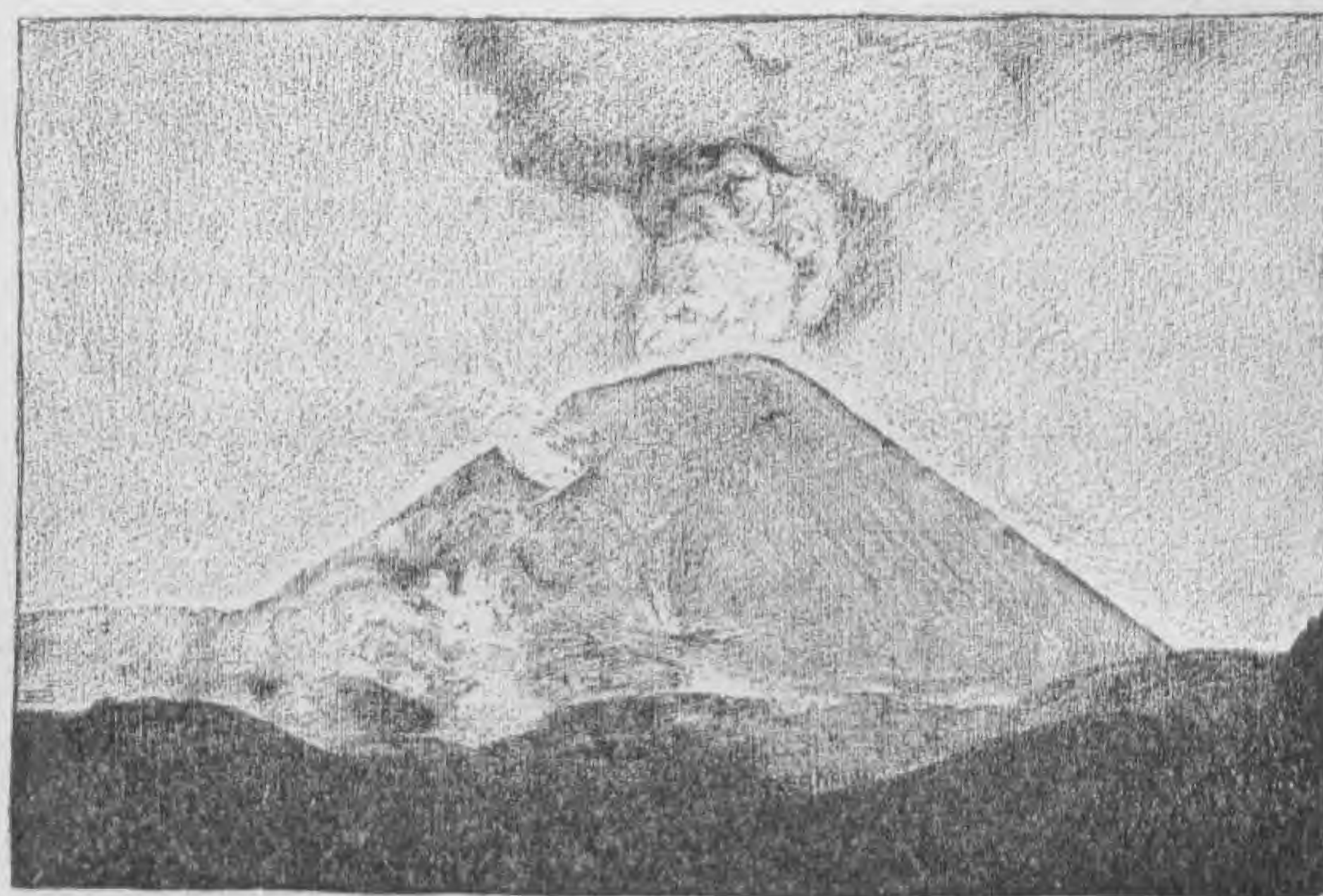
nothing grows upon this whole area. Tufts of gray lichens and some shrubs are found near the edges, but one soon passes them and steps or leaps from one bare rock to another. Be careful not to drop anything that you care for, because if you do, it goes rattling and falling through cracks and chinks from one rock to another down, down, I don't know how far. For under these surface rocks are others, and below these yet more, as far as the eye can see. There is no dirt filling between them; nothing but a mass of loose blocks.

Many of the rocks have, you see, names and dates and initials cut into them. Look at these with surfaces battered and worn smooth. Give me one of our hammers—listen—as I strike this rock—a clear ringing sound like the note of a bell peals out. Here is another one that gives forth the heavy clang of an anvil. We try one after another, two together, try to make a peal or chime, each of us having our own bell-rock. True "ringing rocks"—a strange natural musical instrument out here in the lovely fields.

These rocks may tell us a most interesting story of the past. Let us sit down here on this "clear pealer" and listen to what it has to say. It tells us of a new force in earth-making. We have seen how glaciers, running water, and slow movements of the earth's crust have acted in making the earth what it is. We have studied various kinds of hills and mountains. Here we find one more type of hill.

Soon after the Appalachian Mountain System was formed, there came a time when the principal deposits of sediment by water in the Eastern United States were made in long and narrow troughs lying east of those ridges. The material poured into them was largely a coarse sand with considerable iron in it. These troughs were shallow seas or river-mouth marshes. For a long time there was a subsidence of these trough-like areas and these sand-deposits were gradually thickening. This sediment is now the red sandstone of the Narrows. Finally these long narrow masses of sediment became fissured by cracks extending from great depths and of all widths even up to as wide as two hundred feet. At the same time there burst out through these fissures, all over a region extending from New England to South Carolina, vast quantities of melted rock or lava, filling the fissures and in some cases running out over the surrounding country in sheets or hills capping the fissures. Such a filling of a crack or fissure with melted rock is known as a "dike." This is the way in which our "ringing rocks" were formed. They are the top of a dike of trap filling a great fissure in the red sandstone. Its present features, the form and loose condition of the rock masses, are due to later wear and tear by rain and atmosphere.

Such trap-dikes, thrust up into the fissures of the red sandstone, are scattered along our coastline. They were all formed at about the same



VESUVIUS IN ERUPTION.

time. They are conspicuous around the Bay of Fundy in Nova Scotia; they are the well-known East and West Rocks at New Haven; they form

the Palisades of the Hudson. All these were formed in the same way and at about the same time in the world's history. Think of it—a long line of great volcanic outbursts along our whole Eastern seaboard! Eruption of lava through great fissures everywhere! There have been few times in the earth's history of such activity.

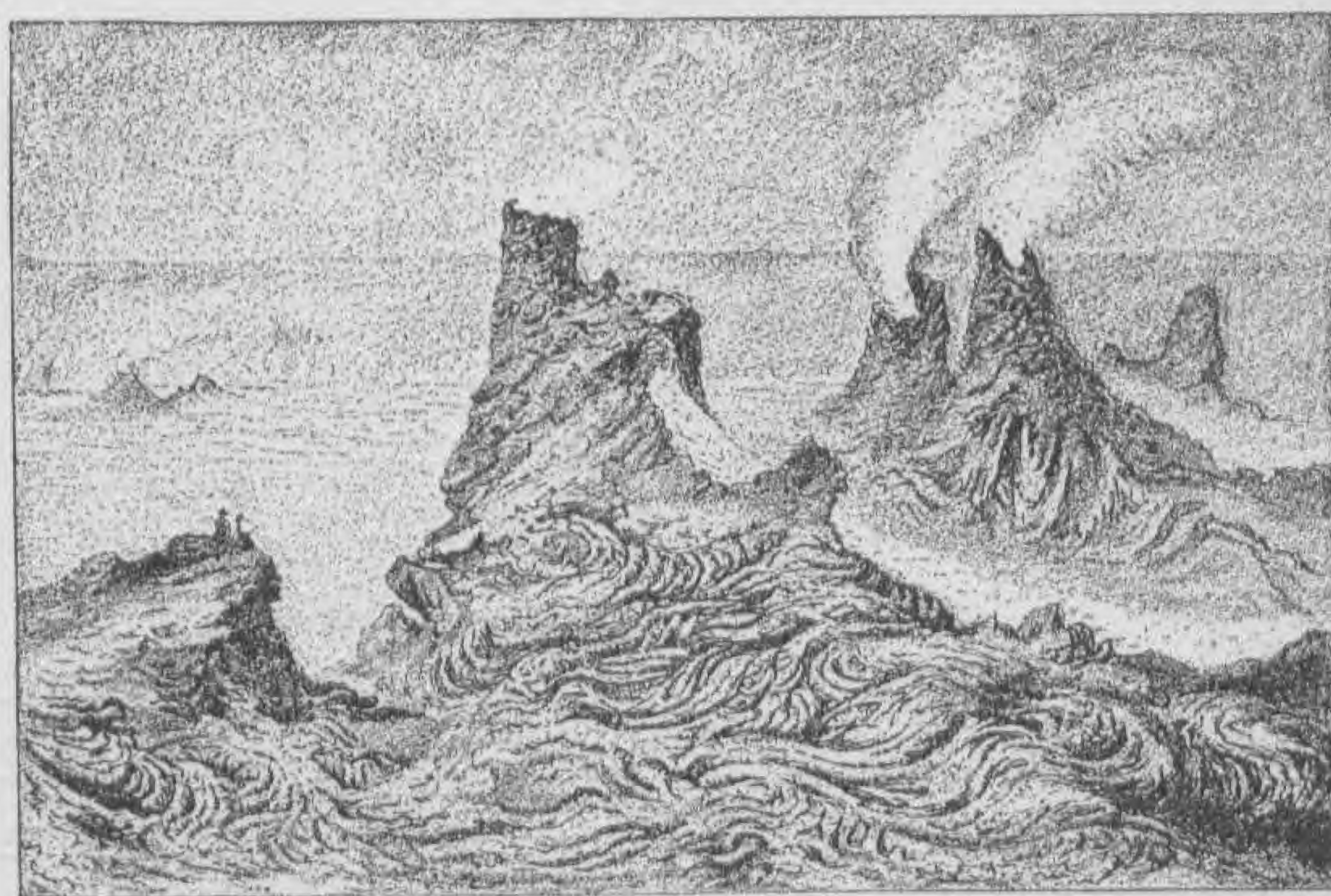
There was however one period in the making of North America when yet mightier action of this kind occurred. In the far West, in the later Tertiary and even in the Quarternary, there were fissures formed out of which were poured tremendous quantities of lava or melted rock. Areas thousands of square miles in extent were flooded with lava hundreds and even thousands of feet thick. This too was a time of great "dike" formation.

Nor was it only in America that "dikes" were formed. The Giant's Causeway and the Island of Staffa with its Fingal's Cave are trap-dikes. These trap rocks in cooling often take on a most curious and regular columnar structure. The last mentioned dike is good examples of this interesting mode of cooling. In all such cases of dike-making we may believe that there is a mass of melted rock, below accumulating sediments. These sediments fracture and slide, and by their pressure on the mass of melted material below force this up to fill the fissure and even to run out above in a lava sheet or hill. This differs from a volcano proper. There we have an opening, which remains open, from which lava is forced out by steam and expanding gases within. Here we have a fissure, filled with materials forced out by the pressure of the fissured rocks. Such an eruption is called a "Fissure Eruption."

Volcanoes proper present us with an example of "Crater Eruptions." In studying these we need to notice three things: the material ejected, the structure of the "cone," and the cause of the eruption. Take Vesuvius as an example of a volcano. When I was a boy I learned at school that "a volcano is a mountain that sends forth fire, smoke and melted rock called lava." Like much else that I learned in those days this is not true. A volcano is not necessarily a mountain, though certainly a mountain tends to form around the crater open-

ing. In the next place it does not send out fire or smoke. The so-called fire is melted rock, or the reflection of melted rock upon the cloud of dust above the crater. The so-called smoke is volcanic dust or "ashes," as it is sometimes, though not rightly, called. An opening in the earth's crust from which vapors, gases, clouds of fine rock-dust and outflows of melted rock go forth is a volcano.

Four different sorts of material may be thrown out by a volcano. Masses of hard rock, either pieces of the lava floor of the crater or masses torn from the sides of the volcano's throat, are thrown out at the beginning of an eruption. Some of these will fall over the volcano's side. Others may drop back into the orifice and be kept alternately thrown up and falling down; and by friction against one another they may be much ground and pulverized into a fine powder or "sand" or dust. This fine dust hovers



KILAUEA IN ERUPTION.

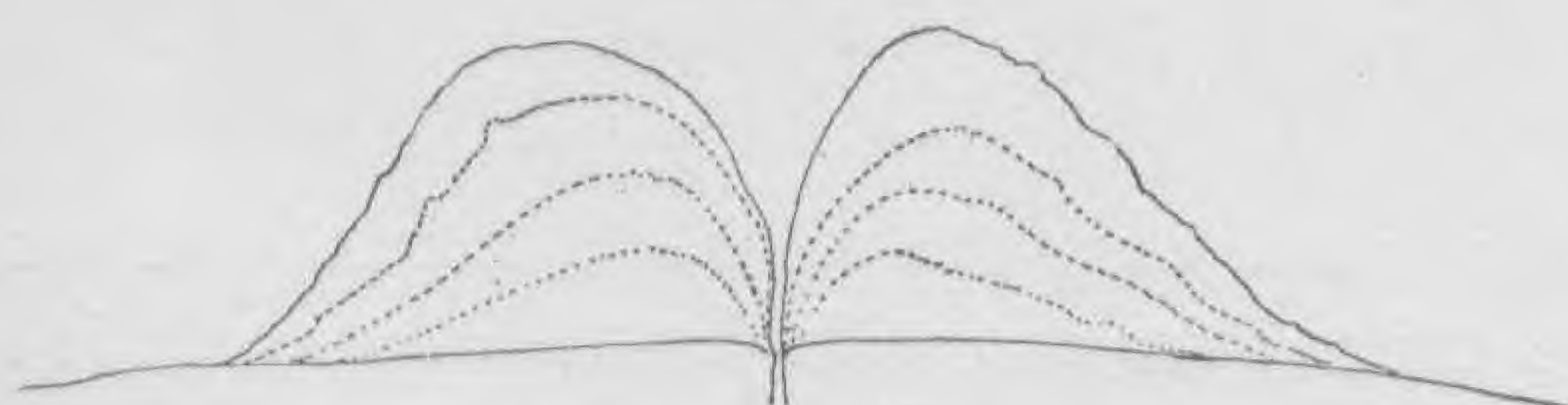
as a cloud over the volcano's mouth and may be drifted far and wide by the winds. It is so very fine that it sifts through keyholes into closed rooms or even into shut drawers of bureaus, or into locked boxes.

It was a fall of such dust as I have described, mixed with water and steam, that covered Pompeii in the great eruption of Vesuvius in A. D. 79. So fine was this dust that it fell closely around and over everything. In bake-shops it inclosed and preserved loaves of bread, and, at the confectioners, dried fruits. It made perfect molds of men's bodies and shows us just how the people dressed. It covered up and has kept till our time the implements of every trade,

houses, shops, paintings, sculptures and pavements. It entombed a living city and has given it up to us, a fossil town. We know almost as much of ancient Roman life at Pompeii as we do of modern Italian life at Naples—all because of the preserving volume of dust.

Thirdly, a volcano may send forth a great amount of water as steam or of gases and vapors of other kinds. Hydrochloric acid, carbonic acid gas and sulphur-fumes are among the more common volcanic vapors. They may escape from the summit at times of eruption, or they may steam up at all times through crevices and small orifices near the volcano or on its flanks. Such vapors, rising through fissures, are often condensed as they come up into cooler regions and deposited as crystals on the fissure-walls. The sulphur and borax we use are very largely manufactured from such deposits of sulphur and boracic acid, and in some volcanic regions the gathering of the crystals and their subsequent treatment is an important business.

Last of the erupted materials is the melted rock or lava. This may be thin and flow as readily as water, or it may be thick and viscid. Volcanoes differ greatly in the fluidity of their lavas, and even the same volcano may vary greatly at different eruptions. Lava cools in various forms according to its liquidity. They vary also in structure, some being full of steam holes and light, others hard, dense, and solid. The lava varies, too, with its position in the



SECTION OF CONE, SHOWING SUCCESSIVE LAYERS.

stream of lava. If near the upper surface it is apt to be filled with air-bubbles or steam-holes. If near the bottom of the stream it is heavy and dense.

An interesting kind of lava is pumice-stone, which is a light grayish white in color, very full of long narrow steam-holes, and so light as to float on water. After an eruption of some volcanoes, as those upon the Mediterranean islands, the sea will be covered with floating masses of pumice. In the Sandwich Island volcano of

Kilauea, where the lava is very fluid, the steam escaping through the lava mass spins it up into the air as delicate thread-like hairs. These are caught up by the wind and carried away. This variety of lava is called Pelé's Hair, and so soft and fine is it that I am told birds have been known to use it for making nests. There are some other interesting kinds of lava, but we cannot here refer to them.

Now for the structure of a volcano mountain.

Here we have a peculiar type of hill or mountain wholly unlike any we have seen before. The whole mountain is called a "cone." The mouth of the cone is called "the crater." The cone is generally made up of the solid rocks, cooled lava, or fine ashes thrown out from the crater. It has been built up by the volcano itself and grows higher and higher with each eruption from the summit. As it was not all built at one time, if we could examine a section of the cone we would find its structure consisted of layers of varying thickness one over the other. Each of these layers is thickest near the mouth of the cone and grows thinner outwards. In some great volcanoes, the sides are dotted here and there with little cones called "monticles." When there is much lava in a cone it frequently bursts out through the side, instead of from the summit, and builds up such monticles. Hundreds of these baby cones are found on the flanks of Etna.

In some volcanoes, notably in Kilauea, there is never an eruption from the crater, but only from the sides. Kilauea, in some respects the mightiest volcano on the globe, consists of a lake of melted rock within a great pit with almost vertical walls. The liquid lavas bubble and wave and sputter like a sea of fire. In time of eruption the lava begins to rise slowly in the great pit. Higher and higher it rises. At last its pressure against the side-walls is so great that a fissure is formed, and out through this the lava pours in a molten stream, running almost like water. If the break is lower than the surface of the lava in the pit, the molten rock, as it runs out, is thrown upward as a jet of melted rock that looks like a fountain of fire. These lava-streams at Kilauea are too fluid to form monticles, and so they run like fire-rivers down to the sea.

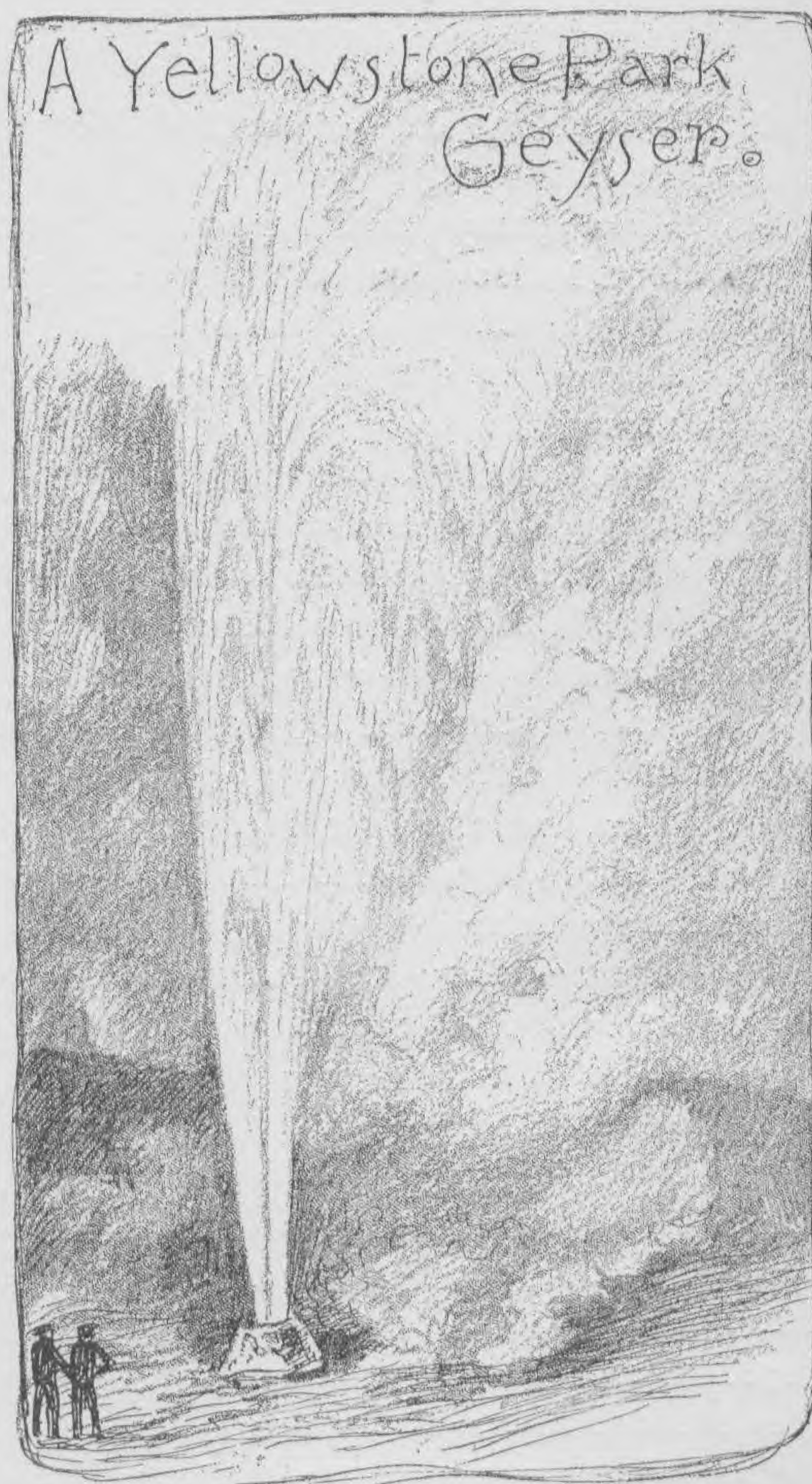
The cause of volcanic eruptions is a much-discussed question. Such explosive eruptions as are presented in the Italian volcanoes are generally supposed to be due to the access of sea-water penetrating to masses of heated rocks in the earth's crust. Steam is produced, which in its escape throws out melted rock, hurls up the old crater floor and sends forth the great cloud of dust or "ashes" — the so-called "smoke."

A third kind of eruptive action must be spoken of. In Iceland, New Zealand, and the Yellowstone district of our own land, are great numbers of geysers. Those in the West are the most interesting. As they have been much described we will only briefly refer to them. One of them, "Old Faithful," every hour casts up a fountain of hot water six feet through and one hundred and fifty feet high. The "Grand Geyser" throws up a jet as thick through, but two hundred feet high, with a jet of steam one thousand feet. The "Grand" is not as frequent in eruption as "Old Faithful," as it acts only once in about a day and a half. All these hot springs are in curious and beautiful stone basins. These are made of a stone somewhat like flint, which has been deposited by the water itself and which forms rosettes, scallops, and dainty lacework around the borders. This rock, in its natural location and dampened by the hot water, has beautiful colors.

Without going into detail as to theories of geyser-origin and mode of action it will be enough to say that water soaking into and passing through hot rocks or cooling lavas may dissolve out silica, secrete a long silicious tube, come to the surface as hot springs with silica-edged basins, and by steam production down near the hottest part of the spring's course give rise to such eruptions as have been above referred to.

Here then we have three modes of action due to heating of masses of the earth's crust or to the heated condition of the earth's interior — dikes or great fissure eruptions, crater eruptions, and geysers. They are connected in cause and have a relation in time. In a given area, for instance our own Western country, there were first great fissure eruptions, dike forming, and

vast overflows giving the immense "lava fields." Time passed. The general activity grew less and was exhibited locally in volcanoes with crater eruptions. Still later, the force ever



getting weaker and weaker, as the last result of the dying vulcanism we have geysers and hot springs. Our great West presents us the last stage of a mighty exhibition of heat's power, in the Yellowstone geysers. Not always are all stages thus clearly presented, nor is an area of fissure eruptions always succeeded by one of marked crater action; but the order suggested is a natural one.

The afternoon is nearly gone! We hurry back to the hotel — the old inn-keeper ferries us across to Holland Station; we "flag" the train and whiz homeward!

Frederick Starr.

THE MOORS IN SPAIN—THEIR KINGDOM OF CORDOVA.

(*Search-Questions in Mahometan History.*)

161. What is the date of the first Moorish raid into Spain?

162. What victory practically gave all Spain to the Moors? How long did the battle last and who was the Christian commander?

163. How early did the Moors begin to invade France?

164. What great battle in 732 decided whether Europe was to be Christian or Moslem?

165. Who was the Moslem leader and what was the French leader afterwards called?

166. Where and when was a part of the army of Charlemagne defeated by the Moors and Basques?

167. Who was the first Moorish king of Cordova and of what deposed family of Damascus was he a member?

168. What rebellion occurred at Cordova in the reign of Hakam, the third sultan or king?

169. What turbulent city was taken by Abd-er-Rahman III. in 930?

170. Between what two foes was the kingdom of Cordova situated at this time?

171. What title did Abd-er-Rahman III. assume in 929?

172. How does this ruler compare with the other Moorish rulers of Cordova?

173. What great man was the actual ruler of Cordova in the reign of Hishām II?

174. What was the general condition of Andalusia soon after this man's death?

175. Who were the Almoravides?

176. What became of the government of the Almoravides?

177. What was the real name of "The Cid"?

178. What Christian king did he serve against the Moors and when was he banished by this king?

179. Under what Moslem king did the Cid next serve?

180. State when the death of the Cid, or Campeador as he was often called, occurred.

ANSWERS TO JUNE SEARCH-QUESTIONS.

121. As a calamity affecting the whole Christian world.

122. Richard I. of England, Philip Augustus of France and Frederick Barbarossa.

123. The siege of Acre conducted by the king of Jerusalem, Guy de Lusignan.

124. Near Azotus, by Richard Cœur de Lion.

125. Saladin seems to have greatly admired Richard and the two antagonists were continually exchanging courtesies.

126. The capture of Jaffa by Richard.

127. In 1193.

128. Pope Celestine III. in 1195.

129. Cowardly conduct of the Germans at the siege of Thoron and consequent dissensions.

130. Fulk, a French monk.

131. No. The Crusaders on account of political complications turned against Constantinople and captured and sacked it in April, 1204.

132. Pope Innocent III. in 1215.

133. Damietta, captured by the Christians and after eight months retaken by the Moslems.

134. A treaty of peace made between the Moslem and Christian commanders which ended the crusade and restored Jerusalem, Nazareth, Jaffa and Bethlehem to the Christians.

135. The English under the Earl of Cornwall redeemed the Holy Sepulchre which at the expiration of a ten years' truce had become the property of the Moslems.

136. In 1248. The Crusaders were defeated, St. Louis taken prisoner by the Moslems and afterwards ransomed and the crusade terminated by a ten years' truce in 1254.

137. In 1270.

138. The capture of Nazareth from the Moslems in 1271 by the English under Prince Edward.

139. The capture of Acre in 1291.

140. Henry IV. The reference is to *King Henry IV.* Part I., Act I., Scene I.

Oscar Fay Adams.



FISH AND EGG DISHES.

(Cooking in the Public Schools.)

IT is a part of the economical plan of the school-kitchen system, that the special lessons on fish and eggs should be given at the time of the year when they are the most plentiful, and the least expensive. Nature has a wise way of arranging things, and it is quite in accordance with her usual wisdom and forethought that both these articles of food should be the least costly at the season when the system most demands them; that is, in the spring and summer. In the cold weather of winter we need the heat-giving of meat; but in the summer, and indeed in the spring, when the first warm days are coming on, the meat in any quantity is distasteful, and one likes best the fresh eggs and the delicate fish. You will probably understand, through your lessons in chemistry and in physiology, that meat stimulates nerves and brain, and that this stimulation should be avoided in warm weather. There is neither time nor space to talk about this in the limits of one chapter; the best one can do is to state the fact, and those of you who are not informed can read up a little or ask your mother about it.

Fish and eggs are given in separate lessons, but we take them together to save space. To begin with the fish. There really is no more valuable food in all the list. It is easy of digestion, it is inexpensive, and it is plenty. It has not the amount of nutrition which meat possesses, but it has sufficient, and as it has a large amount of phosphorus, it is very beneficial. Fish should be eaten perfectly fresh, while the flesh is yet firm; otherwise all its beneficent qualities are lost, and it becomes poisonous. Never buy fish when the flesh is soft and flabby, unless you desire a genuine fit of indigestion, if not a severe and painful illness.

In one of the school-kitchens a class of boys has been admitted during the winter just past, and it has proven a very bright class.

"We had a prime fish-chowder to-day," said one of these boys to his teacher, on coming to the school in the afternoon.

"Did you make it?" queried the teacher.

"No. I gave my mother a cooking-school lesson, and saw that she did it just right. Father says it was the best he ever tasted."

And now I am going to give you the school-kitchen rule for that "prime fish-chowder." You will observe the following proportions in preparing your ingredients:

To every pound of fish—cod or haddock is the best—use a one-inch cube of salt pork, half of an onion, two potatoes, a speck of pepper, one tablespoonful of flour, one tablespoonful of butter, one cup of milk and two crackers.

See that the fish is carefully cleaned and cut into pieces after the bone is removed. You may bone the fish yourself, or the marketman will do it for you. Cook the bones of the fish and the head for half an hour in boiling water, then strain the water from it and save. Cut the salt pork and onion into dice, and fry until they are a light brown. In the meantime slice the potatoes, and let them scald for five minutes, pour off the water and add to the scalded potatoes the bone water and the pork fat, which has been strained to remove the pieces of onion and the solid bits of pork. Put this over the fire in a stew-pan, and when it is boiling add the fish, and simmer ten minutes or until the potatoes are tender; last of all add the pepper, butter, milk and crackers.

I am sure if any of you try this receipt you will find that it is delicious, even if you do not,

like myself, care much about the ordinary fish-chowder. You see this is an extraordinary one.

There are a variety of ways of cooking fish, but they are most generally baked or broiled; sometimes they are boiled, and sometimes fried; but the most wholesome ways are the two first mentioned.

The fish which are the oftenest used for baking are cod, haddock, blue-fish, bass, shad and small salmon. The fish should be well cleaned — indeed that is necessary whatever way it is to be cooked — wiped dry and rubbed with salt. It should then be stuffed and the edges sewed together. The stuffing will be prepared by the following rule, and it is sufficient for a fish weighing from four to six pounds. Use one cup of cracker-crumbs, one salt-spoonful of salt, one salt-spoonful of pepper, and one tablespoonful of chopped onion, one teaspoonful of chopped parsley, one teaspoonful of capers, one teaspoonful of chopped pickles, and a quarter of a cup of melted butter. The crackers should be moistened with hot water if you desire a moist stuffing, otherwise it will be dry and crumbly. After the fish is stuffed cut gashes two inches apart on each side. Put narrow strips of fat salt pork in the gashes, and in the pan under the fish. Place the fish upright in the pan by skewering the head one way and the tail another. Dredge the fish with flour. Put it into a hot oven without water; when the flour is brown, baste with the pork fat, and baste often. It is done when the flesh separates easily from the bone. Remove it carefully to a hot platter, draw out the strings or skewers and serve with drawn butter or egg sauce.

You "don't know how to make either?" Well, you will very soon, if you will only follow the directions that the cooking-school teacher will give you. Here is the drawn butter:

Use one pint of hot water or milk — the latter is by far the best, if you can get it — one scant cup of butter, two tablespoonfuls of flour, one half a teaspoonful of salt, and one half a salt-spoonful of pepper. Put half the butter into a sauce-pan over the fire; let it melt, but not burn; when it is melted add the dry flour and mix well. Add the hot water or milk, a little at a time, and stir rapidly as it thickens.

When perfectly smooth add the remainder of the butter by degrees, and stir until it is dissolved. Add the salt and pepper. When carefully made this sauce should be free from lumps; but if not smooth, strain it before serving. Now egg sauce is simply this drawn butter with two or three hard-boiled eggs, chopped or sliced, added to it.

It is not so difficult as it seems, is it?

The fish that are broiled are mackerel, white-fish, blue-fish that are too small to bake, trout, small cod, shad, or any other thin fish; also slices of halibut, salmon, and other thick fish. When the entire fish is broiled it should be split down the back, and the head and tail removed. It is a good plan to remove the backbone also. If the fish is oily it needs only to be sprinkled with salt and pepper; if it is dry, the fish should be spread with half-melted butter before broiling.

The double wire broiler should be well-greased; put the thickest edge of the fish next the middle of the broiler; broil the flesh side first until it is brown, lifting it up often that it may not burn. The other side should be broiled just enough to crisp the skin. Of course the time the fish should cook will vary with its thickness. When it is done the flesh will look white and firm, and will separate easily from the bone. After the fish is cooked, season it with butter, salt, and pepper, and lemon juice. The latter may be omitted if preferred.

Now the lesson about eggs.

It is surprising how many people there are who do not use eggs as a matter of course for an article of diet. In the spring-time, particularly, they are more healthful than heavy matter, and they are then at their cheapest, so it is not extravagant to use them freely. Many persons who do not care specially for them when boiled, or who have grown tired of them from constantly having them cooked in that way, would like them if they were made into an omelet or dropped on toast; they somehow seem more delicate when cooked in either of these ways, and they look very much nicer coming to the table. It is not the easiest thing in the world to make an omelet; indeed it is a little troublesome until one gets quite accustomed to it. But practice will soon enable one to not only prepare, but to cook — which is the

difficult part — an omelet which shall rival that of the experienced cook. For a small omelet you will use two eggs, two tablespoonfuls of milk, one salt-spoonful of salt, one salt-spoonful of pepper. Beat the yolks of the eggs until they are light and creamy, and to these beaten yolks add the milk, salt and pepper. Beat the whites until they are stiff and dry. Stir them lightly into the yolks until they are just covered, but do not beat them. When your smooth omelet pan or small spider is hot, rub it round the edge with a teaspoonful of butter; let the butter run over the pan, so that it is entirely covered, and when it is bubbling turn in the omelet quickly. Cook very carefully, not over the hottest part of the fire, else it would burn, until it is slightly browned underneath; put it in the oven so that the top may dry, but do not let it burn; fold toward the right, put a hot platter over the pan, then turn all over, so that the omelet will drop evenly on to the platter.

This is really the most difficult of all the egg dishes, and the only one that it is necessary to give, since all the others are so simple and in such constant use that it would be like relating an old story to tell about them.

It may seem to you that this chapter is largely filled with "rules." Possibly; but there is so little to say in a general way about either of the food articles, that the space may be given to detailed work. Everything which has been described is so simple that it may be tried at home, and with little fear of failure.

In connection with the egg-lesson simple cake batters are taught, and these lessons the girls seem to enjoy very much. Somehow girls almost all like cake-making. That, and making delicate desserts, are the fancy-work of cooking. It is all very well, too, in its way, and a certain amount of it, but after all it is the every-day substantial food that is the most necessary, and that must be done.

Sallie Joy White.

THE AUSTRIAN YELLOW.

(Stories about Famous Precious Stones.)

THE subject of this article is, as its name sets forth, a diamond of a yellow hue. After the Orloff it is the largest cut diamond in Europe, weighing one hundred and thirty-nine and a half carats. Tavernier, who first mentions it, says "it has a tinge of yellow which is a pity." King declares, "on the highest authority," which he does not further particularize, that this tinge is a very strong one, almost destroying its brilliancy.

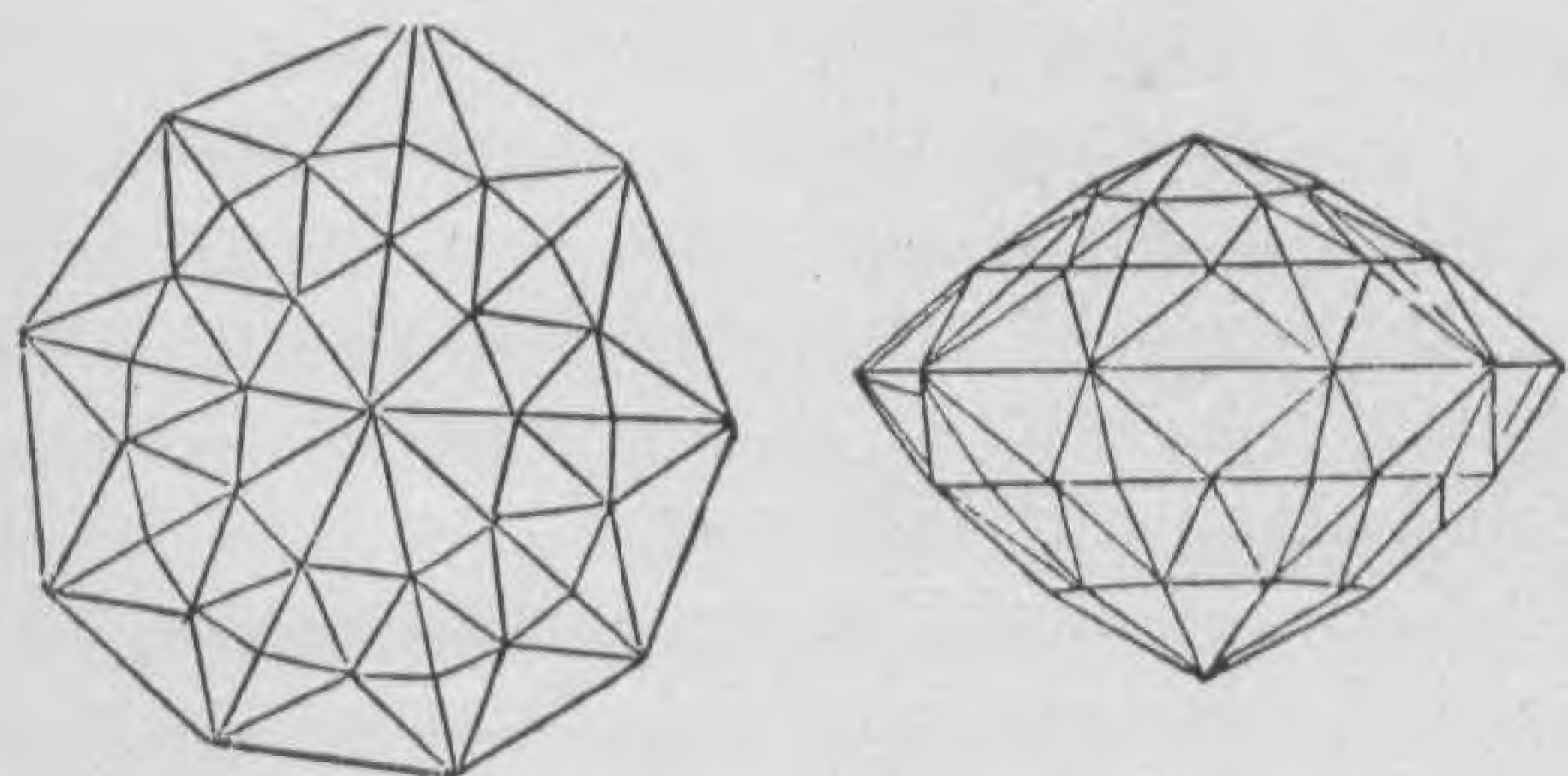
Yellow diamonds are not necessarily devoid of brilliancy, as we can bear witness from personal knowledge. There was recently offered for sale at a public auction in London a very large specimen known as the Orange Diamond, of one hundred and ten carats weight, which we carefully examined. The circumstances were decidedly adverse to the beauty of a diamond, for it was in the half-light of a London fog that we saw it, yet the stone seemed literally to shoot tongues

of yellow fire from its facets. It was a round brilliant, and being set in a circle of about a score of white diamonds its tawny complexion was shown to admirable advantage. The jewel was supported on a delicate spring which vibrated with each step upon the floor, so that there was a constant coruscation of light around it.

It is difficult to establish the early history of the Austrian Yellow. Tavernier saw it in Florence somewhere about 1642, but he does not say whence it came. Its appearance proves it to be an Indian-cut rose, but that does not help us much with regard to its private wanderings in Europe. A good authority on diamonds, de Laet, who flourished shortly before Tavernier's time, declared that the largest diamond then known weighed seventy carats, which would clearly indicate that he knew nothing about the much larger yellow diamond. Tradition relates that it was bought for a few pence in the market

at Florence, under the impression that it was a piece of glass! If this is so, one would be glad of some particulars of the moment when the happy possessor found out his mistake.

Tavernier says that "the Grand Duke (of Tuscany) did him the honor to show him the



THE AUSTRIAN YELLOW—TOP AND SIDE.

diamond several times." He made a drawing of it, as he did of nearly all the large diamonds he saw, and his estimation of its value is two millions of livres (about four hundred thousand dollars)—a low price considering the size of the stone; but no doubt its yellow tinge had something to say to it. The Grand Duke of Tavernier's time was Ferdinand II., who reigned from 1621 to 1670—a man of considerable enlightenment, a protector of Galileo and an encourager of literature.

If there is any truth in the popular belief to which we shall presently allude, that diamonds promote the mutual affection of husband and wife, then indeed the great yellow stone had need of its charm in the case of Ferdinand's son and successor, Cosimo III. This luckless prince was married to Marguerite Louise d'Orleans, niece of Louis XIV., a young lady of flighty fancies and obstinate willfulness. Being deeply attached to her cousin of Lorraine, she was only induced to give her hand to the heir of Tuscany on the threat of imprisonment in a convent. She was married in 1660 and made her state entry into Florence amid unparalleled splendor. Immediately afterwards the courts of Europe rang with the quarrels of the newly-wedded pair. The Pope of Rome, the King of France, mother, sisters, aunts, ambassadors, bishops, cardinals, lady's maids, each in turn interfered with the object of restoring harmony, and each in turn ignominiously failed. Here surely was work for the diamond had it been possessed of its reputed power.

During this time and for many years afterwards, the diamond about which we write was known as the "Florentine" or "Grand Tuscan." It was the chief jewel in the treasure-house of the Medici, and no doubt filled a conspicuous place in the pageants of the grand-ducal court. The Florentine sovereigns were not wealthy, but upon state occasions they made extraordinary displays which sometimes deceived foreigners visiting among them into a false idea of their affluence. A wedding was always a favorite occasion upon which to show off their finery. For example, at the marriage of Violante de Bavière with the son of Cosimo III., a magnificence was displayed such as was never before seen even in Florence. The bride sat on a car studded with gems. Her father-in-law with his crown, no doubt containing the great diamond, upon his head, met her at the gate of San Gallo and escorted her to the palace.

This princess dying childless, the throne was occupied by Giovan-Gaston, another son of Cosimo III. and the flighty Marguerite. He likewise left no heirs, so with his death in 1737 terminated the great house of Medici. Giovan-Gaston was succeeded on the grand-ducal throne by Francis Stephen of Lorraine, who was forced much against his inclination to change his paternal duchy of Lorraine for that of Tuscany. He was married to Maria Theresa, archduchess of Austria, afterwards so famous as the Empress-queen who fought valiantly against Frederick the Great. By the will of Giovan-Gaston dei Medici all the statues, books, pictures and jewels of his palace were "to remain forever at Florence as public property for the benefit of the people and the attraction of foreign visitors," and none were to be removed from out of the Grand Duchy.

Francis Stephen and Maria Theresa entered their new capital, remained there four months, and then departing carried away with them the great Tuscan diamond. So much for the respect paid to the wills of dead princes! Henceforward the yellow diamond was known as the Austrian Yellow in recognition, we suppose, of the royal thief who carried it off from Florence.

At the coronation of Francis Stephen as emperor of Germany at Frankfort-on-the-Main, on the fourth of October, 1745, the pilfered dia-

mond was used to decorate his Majesty's imperial diadem. Maria Theresa had been extremely anxious for her husband to be emperor, both because she was fondly attached to him, and because she wanted him to hold a title equal at least to her own as Queen of Hungary. She stood on a balcony at the ceremony and was the first to salute him with the cry of "Long live the Emperor!" when the crown had been placed upon his head. Our readers will of course be aware that the imperial dignity was an elective one. It remained, it is true, in the Hapsburg family, still it did not descend from father to son like the other crowns of Europe, and the ceremony of a fresh election was gone through at the death of each emperor.

Napoleon, who upset most things in Europe, failed not to upset the throne of Charlemagne. The Holy Roman Empire ceased to exist in 1806, and Francis I., the elected emperor, abdicated the old German throne to mount the brand-new one of Austria.

We return to our diamond.

Francis Stephen, although emperor and reputed owner of the yellow diamond, was quite overshadowed by the fame and splendor of his wife Maria Theresa. It is on record that one day being present at some high ceremony, he left the circle around the throne and went to sit in a corner beside a couple of ladies. They rose respectfully at his approach.

"Oh! don't mind me," he said, "I am only going to sit here and watch the crowd until the court is gone."

"As long as your Imperial Majesty is present the court will be here," replied the ladies.

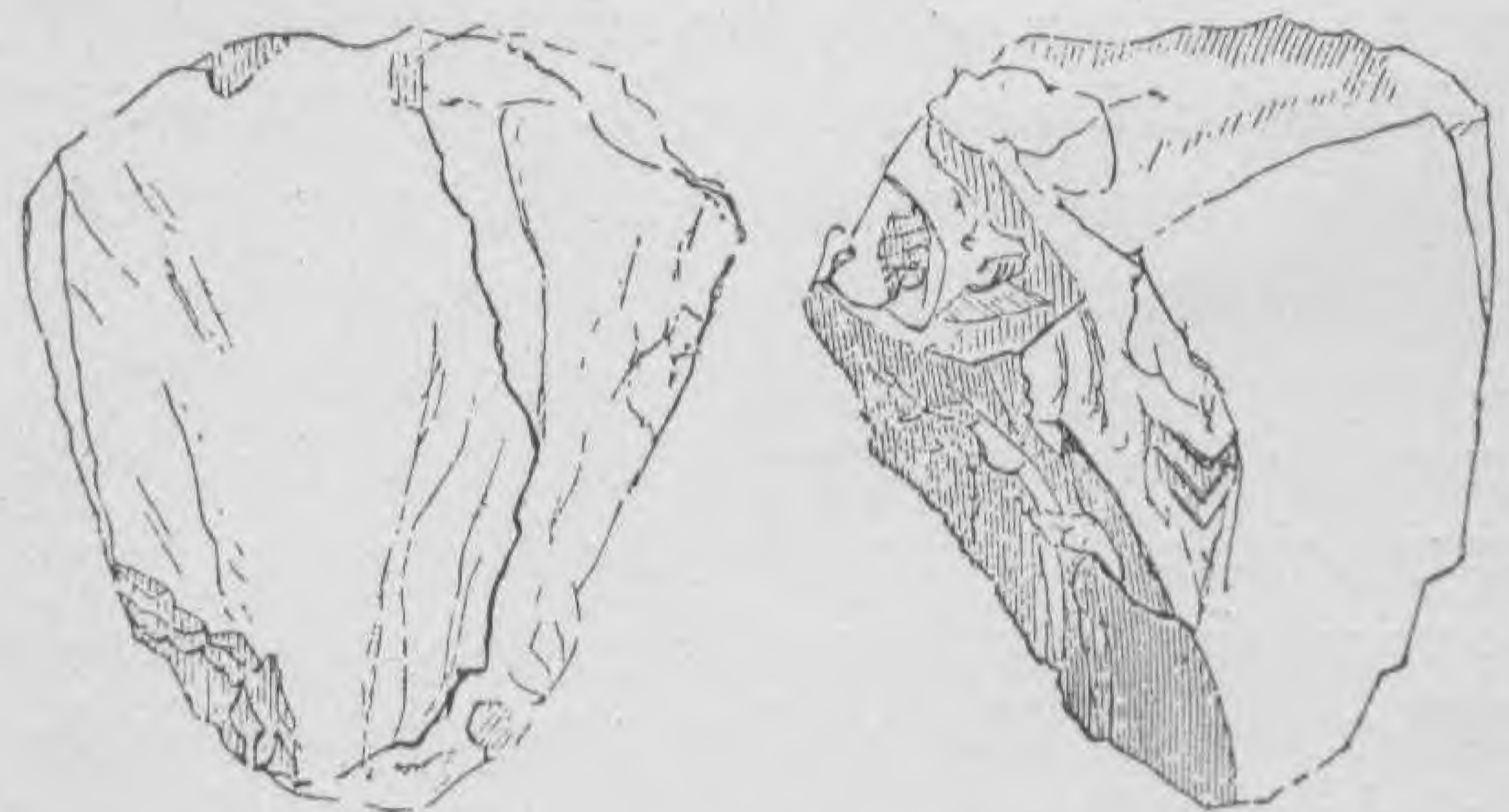
"Not at all," said Francis Stephen. "The court is my wife and children. I'm nobody."

And such indubitably was the fact. The Empress adored him, but he was nobody and has left but little trace in history. He was very fond of money and sometimes resorted to singular means in order to turn an honest penny. When his wife was engaged in that long struggle with the King of Prussia which goes in history by the name of the Seven Years' War, he made a good sum by supplying the enemy's cavalry with forage. Another strange though somewhat less crooked means of augmenting his riches is related concerning his diamonds.

He employed himself for a considerable time in a series of experiments which had for their object the melting down of small diamonds with the view of making a large one. No doubt Francis Stephen would have been very pleased to smelt up a good number of diamonds if he could thereby have produced a match for his great yellow gem; but it is easier to burn diamonds than to fuse them.

The storms and revolutions which nearly shook the house of Austria to the ground have left its diamond untouched. It was carefully preserved in the hasty flights from Vienna which occurred during the effervescing period of 1848 when all Europe was in an uproar. And now it reposes peacefully as a hat-button for the Emperor Francis II. In appearance the diamond is a nine-rayed star, and is all covered with facets, according to the true Indian fashion. It may possibly interest the reader to hear what the Austrians themselves think of their diamond. The following extract is made from the official account furnished to Mr. Streeter:

"This jewel was once the property of Charles the Bold, Duke of Burgundy, who according to the custom of the day carried all his valuables in the battlefield, first to have them always in sight, and secondly on account of the mysterious power then attributed to precious stones. Charles lost this diamond at the battle of Morat, on the twenty-second of June, 1476. Tradition relates that it

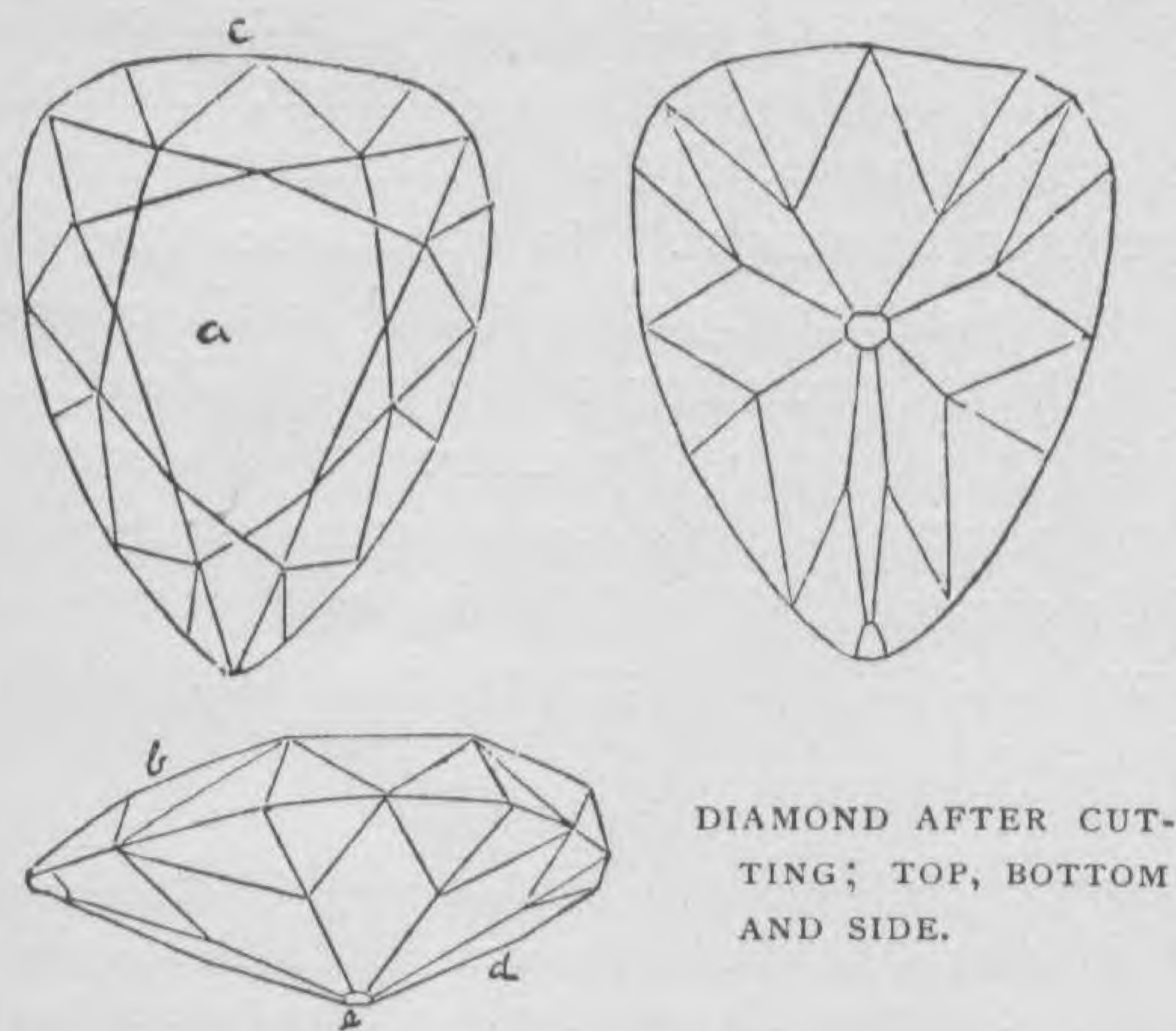


DIAMOND IN THE ROUGH.

was picked up by a peasant who took it for a piece of glass and sold it for a florin. The new owner, Bartholomew May, a citizen of Berne, sold it to the Genoese, who sold it in turn to Ludovico Moro Sforza. By the intercession of the Fuggers it came into the Medici treasury at Florence. When Francis Stephen of Lorraine exchanged this duchy against the grand-duchy of Tuscany he became owner of the Florentine diamond."

Of this extraordinary tale the concluding sentence alone is the only one worthy of the slightest attention; all the rest is mere legend. Contemporary accounts show that Charles the Bold had no diamond at all similar to the Austrian Yellow either in size or shape; two very important factors in establishing the identity of a diamond.

We have now reached the last great diamond which it is our purpose to chronicle, and it is hoped that the reader has become sufficiently interested in these sparkling pebbles to bear



with equanimity a few technical details concerning their nature and the processes which they undergo before becoming ornaments for the crowns of kings or the brooches of queens.

That the diamond depends for its beauty almost entirely upon the labor of man is sufficiently known. The rough diamond is seldom a beautiful object, being usually coated with a greenish film which gives it the look of an ordinary pebble. It requires the eye of an adept to recognize any potentiality of sparkle in so dull a lump. The ordinary rock-crystal is infinitely more beautiful until the royal gem has been transformed by human skill. But after the touch of the magic wheel there is no substance which can compare with the diamond for luster, brilliancy and iridescence.

Certain Indian diamonds finished by the hand of Nature and known as "Naifes," are an exception to the rule that rough diamonds are dull looking. They are seldom or never found now,

but were greatly prized by the natives in olden times and considered superior to the artificially polished stone. They were octahedral in form, with polished facets. The primary crystalline form of the diamond is the octahedron, or a figure of eight sides; but it by no means confines itself to this form alone. It sometimes assumes twelve-sided shapes, or is merely a cube, or yet again variations of these figures.

The atoms composing the diamond tend to place themselves in layers, and the discovery of this fact facilitated the cutting of the stone, as by finding the grain a skillful manipulator was able to cleave off protuberances at a blow.

The accompanying diagrams represent a certain large diamond both in the rough and after it was cut into a brilliant, and they will help to explain the process of diamond-cutting, which is briefly as follows: The first process is to make lead models of the stone in its actual state and also in the ideal, namely, after it is cut. By this means is found out the most economical way to shape it. The next step is to cleave it toward that shape as far as possible. Cleaving is performed in two ways; by a steel saw strung on a whalebone and coated with diamond dust which saws off the required amount; or by scratching a nick with a diamond point in the direction of the grain and splitting it off with one blow. This latter process, observes an old writer, requires great strength of mind as well as dexterity of hand, for by an unlucky blow a valuable stone may be utterly ruined. Supposing however that the cleavage has been safely performed, the diamond is next fixed into a handle and is so imbedded in a soft cement as to leave exposed only that portion which is to be ground. By means of another diamond similarly imbedded in a handle it is worked down to the requisite shape. The dust from the two grinding diamonds is carefully saved and is used for polishing them. This process is effected by means of a disk of soft iron about a foot in diameter, coated with the diamond dust mixed with olive oil, and made to revolve very rapidly in a horizontal position. The portion of the diamond to be polished is then pressed against the revolving wheel and a high state of polish is thus attained. The grinding of the facets is entirely governed by eye, and such is

the dexterity and accuracy attained by good manipulators that perfect roses are cut so small that fifteen hundred of them go to the carat; and when we remember that one hundred and fifty carats go to an ounce we shall have some faint idea of the minuteness of the work.*

In Europe the brilliant is the usual form to give to the diamond, and the one most admired. The invention of this particular method of cutting is due to Vincenzo Peruzzi, a Venetian, who seems to have introduced the fashion in the latter half of the eighteenth century. He discovered that the utmost light and fire could be obtained by reducing the diamond to the shape of a pair of truncated cones, united at the base with thirty-two facets above and twenty-four below the girdle or largest circumference.

Reference to the illustrations will explain the following technical terms: *a*, the upper surface, is called the *table*; *b*, its sloping edge, the *beasil*; *c*, the girdle; *d*, the lower pointed portion, is called the *pavilion*, and the bottom plane, the *collet*. Of the thirty-two top facets only those are called *star-facets* which touch the table; all the rest, as well as those below the girdle, are called *skill-facets*.

The old "table diamonds," once so highly prized, may be described as having the table and collet greatly enlarged at the expense of the beasil and pavilion. The rose diamond is covered with equal facets, either twelve or twenty-four in number, the base of the stone being flat. This rule holds only for European roses; the Orientals covered their diamonds with irregular facets following exactly the shape of the stone, as with them the one object was to preserve the weight of the stone as far as possible.

Chemically speaking, the diamond is almost pure carbon, and may be said to be first cousin to ordinary coal and half-brother to the smoke of an oil lamp. If the lordly gem should refuse to acknowledge such mean relations it can always be confronted with the "black diamond," which though an undoubted diamond, looks so very like a piece of coal that the kinship is evident. The present writer once saw a very costly *parure*

belonging to the Countess of Dudley, composed entirely of black diamonds set heavily in gold. Being a very little girl she considered it a great waste of the precious metal to employ it to set such ugly stones. She is of the same opinion still.

In ancient times the diamond was credited with a vast number of occult virtues. Thus it was said by the Romans to baffle poison, keep off insanity and dispel vain fears. The Italians believed that it maintained love between man and wife, but we have already seen one notable instance in which it signally failed to render this useful service. One is at a loss to imagine how such a belief became common, seeing the number of diamonds which belonged to royal personages, and the state of affairs prevalent in their domestic life. In England, at the same period, diamonds were looked upon as deadly poisons. The murder of Sir Thomas Overbury in the Tower of London during the reign of James I. was said to have been attempted by means of these gems ground to powder. Overbury certainly died, and presumably by foul means, but modern science has acquitted diamonds of having any share in the crime.

There is a certain rule for estimating the price of a diamond, and singular to say it is the old Indian rule by which Tavernier was guided in his purchases, and which modern commerce has been content to let stand. The current market price of a good cut diamond one carat in weight being ascertained, the square of the weight of the diamond to be valued is multiplied by that figure. The present selling price in London of a clear and faultless cut diamond one carat in weight is one hundred dollars, one of three carats therefore would be worth $3 \times 3 \times 100 = \900 .

Were our advice asked with regard to the purchase of these valuable pebbles whose history has so long occupied our attention, we should refer our interlocutor to that Chinese philosopher who on being asked why he kept bowing and saying, "Thank you, thank you," to the gem-bedecked mandarin, replied:

"I am thanking him for buying all those diamonds and undertaking the trouble and anxiety of keeping them safe that I, undisturbed, may look at them and admire them at my leisure."

Mrs. Goddard Orpen.

* The carat is the seed of a kind of vetch common in India, and is of such uniform weight that it naturally suggested itself as a standard measure, just as in our country the barley grain was taken as the unit.

THE ART OF SWIMMING.

(Ways To Do Things.)

SWIMMING is an art; so manly, so graceful and so useful that no one ever regrets the trouble of learning. And every one can learn, save he be physically infirm or naturally a coward.

Dr. Franklin truthfully said: "The only obstacle to the acquirement and improvement in this necessary and life-preserving art is fear." The coward better stay out of the water. He is safer on land. But he is not necessarily a coward who is afraid to plunge boldly into unknown water—such a reluctance is natural; the best swimmer, unless he be foolhardy, would not do that. Some of the best swimmers have learned in shallow creeks, have practiced alone until skilled, and then polished their self-education in deep water.

The first lesson should be taken in a tideless river or quiet stream, the depth of which you have previously studied. On entering the water, wet your head and neck thoroughly, and before submerging the body stand for a few minutes knee-deep.

Having fixed your eye on a favorable spot, advance into the stream until breast-high. Now, face the shore and prepare for striking out. Lie gently on your breast, keeping head and neck upright, breast distended and back bent inward. Withdraw the legs from the bottom and immediately strike them out, not downward, but horizontally; strike forward with the arms simultaneously with the feet, holding the hands like the blade of an oar, when in action, fingers closed, the thumb placed by the side of the first finger, a little below the surface; draw them back again while gathering up the legs for a second attempt; and thus push forward, making use of the hands and feet alternately. The farther forward you reach, the faster you will swim. The secret of a good stroke is to kick out with the legs wide apart. The propelling power is secured by the legs being brought from a position in which they are placed wide apart to one in which they are close together, like the

blades of a pair of scissors. In this position the heels should touch each other, and in drawing up the legs, the toes should be pointed backward to avoid the resistance of the water against the insteps.

It may happen that you will swallow water in your first efforts, but this should not discourage you, neither should the fancy that because you make but little advance you are not capable of learning to swim. Every beginner has his mishaps, no matter what the art.

Some lads will learn to swim "dog-fashion" quicker than any other style, and while it is not at all graceful, it gradually leads into the smooth, even, scientific breast-stroke, and therefore should hardly be discouraged. Every boy, of course, knows that "dog-fashion" is that frantic motion of the hands and legs like a large paddle-wheel, in which more bluster and foam than headway are made, and every boy likes to swim "dog-fashion" occasionally, often just to "show off," or to imitate some friend not so far advanced as himself. But, "dog-fashion" swimmer, don't let such mimics dishearten you; keep right on, and soon you will master the breast-stroke as we have described it, and by studying some of the tricks in this article, you may soon have the laugh on your mockers. "He Laughs Best who Laughs Last."

Having mastered the breast-stroke, which is adapted to long-distance leisurely swimming, the next movement is the side-stroke; it may be the left or right, or either. You can accomplish it by shooting the right arm forward, while the left, like an oar, is forcing the water back, and the legs are propelling the body onward. This stroke, which is a powerful one, will move you on like clock-work, and for long distance moderately fast swimming is excellent.

Then follows the alternate right-hand, left-hand movement, or the overhand-stroke. This is perhaps the most graceful and convenient of all. In reaching forward, the arms are alternately brought out of the water, and then curved

so that the tips of the fingers enter again directly in front of the head. This movement can be made very graceful by daintily skimming the palm along the surface and merely dipping the water before it disappears. For short-distance swimming, you will find no speedier stroke. Advancing the right and left sides of the body alternately secures greater continuity of motion and materially reduces the friction, and in conjunction with the powerful propulsion of the legs, sends you along with the speed of a fish. As it is very swift, so it is very exhausting, and, therefore, best adapted to racing, say fifty or one hundred yards.

I once saw Dennis F. Butler, the champion swimmer of America, finish a seven-mile race against the tide with this overhand stroke; and he did it in a peculiar manner. With every dip of the arm his head would go under water, and thus he lolled, yet fairly plunged for the goal, taking breath every time he turned on his sides.

The boy-aspirants to racing honors will do well to practice this movement diligently.

HOW TO FLOAT.

Back performances are more easily learned than those on the breast, and floating is quite simple.

Turn yourself over on your back, as gently as possible, elevate your breast above the surface, put your head back, so that your eyes, nose and chin only are above water. Keep in this position, with the arms and legs extended, the latter perfectly rigid. Now, move the hands from right to left horizontally, fast or slow as you choose, and you will find yourself buoyed up and gradually moving along. If you wish to make greater speed or swim on your back, begin to work your legs, precisely as in breast-swimming, taking care not to lift the knees too high nor sink your hips and sides too low, and keeping yourself as straight as possible. You are now progressing finely — getting along easily and speedily. If your arms grow tired, lay them on your breast, but keep the legs going, and you can rest them; if your legs tire, let them remain quiet, and renew work with your hands. Thus alternating, you will find

yourself able to cover a long distance without fatigue.

HOW TO DIVE.

Just at this stage of progress you will be anxious to dive. There is great sport in this; but it requires practice to dive "cleanly."

Diving may be performed from the surface of the water, when swimming, by merely turning the head downward, and striking upward with the legs. It is, however, much better to leap in, with the hands closed above the head, and the head foremost, from a pier, boat or raised bank. The proper attitude for a "clean" dive — which means without splashing more than the sharp cut of the hands — is to place the hands over the head, close together, give a sudden spring, and descend through the air, heels together and body perfectly stiff. Your hands will cleave the way for your body, protecting your head, and you will pass beneath the surface just like the inimitable bull-frog — the master-diver.

By striking with the feet, the same as in swimming, and keeping the head toward the bottom you can drive yourself to a considerable depth.

If you want to reach the surface, turn your head upward and work your hands, up and down, and you will ascend like a flash.

To turn under water, merely swim in whichever direction you wish.

Some swimmers prefer to keep their eyes open while beneath the surface; I do not consider it wise, as the strain is great, and often foreign substances in the water are liable to injure the eyeball. Of course, if you dive for an object at the bottom, you will need to open your eyes to find it; at other times I advise you to keep them closed.

Swimming under water is accomplished by the ordinary stroke, but take care to keep your head a little downward and strike a little higher with your feet than when swimming on the surface.

TREADING WATER.

If you have successfully practiced these lessons, you are familiar with the three essential elements of swimming, and in prime condition to study a few tricks.

"Treading water" is a fine feat. To tread without the use of the hands, work your feet up and down, precisely as though ascending a flight of stairs, only with more speed and steadiness. You will find this very simple, and oftentimes you can stand where the water is a fathom deep and by treading hold the hands high over the head and make the uninitiated suppose you to be on the bottom. In this position, also, you can walk a considerable distance, when you are expert. If you want to ease your legs, put your arms under and work them horizontally right and left, as in floating.

The feat of breast-swimming without the use of the hands requires strength in the legs and back. At best, but a short distance can be made in this way. The same may be said of swimming without the use of the legs. But it is well to practice both of these movements—they may save your life in the event of cramp or an accident.

To show the feet while floating, bend the small of the back downward, support yourself by moving your hands to and fro just above your breast, and stretch your feet above the water. Now, if you wish to swim on your back feet-foremost, make precisely the same stroke as in breast-swimming.

To swim with one hand out of water, say the right, turn on the left side, and vigorously use that arm, and the legs.

If you wish to turn while on your back, keep one leg still and embrace the water beside you with the other; thus you will find yourself turn to that side on which your leg by its motion embraces the water, and you will turn to the right or left according to which leg you use in this manner.

There are a variety of feats performed by expert swimmers; such as floating on the back with the arms above the surface; taking the left leg in the right hand out of the water, when swimming on the back; pulling the right heel by the right hand toward the back, when swimming in the common way; throwing somersaults in the water, backward and forward, etc., for which no particular directions are necessary, as you will be able to do them and any tricks which your fancy may suggest.

HYGIENIC HINTS.

Do not bathe shortly after eating; an interval of an hour and a half should be allowed, at least. Do not bathe when tired out, either mentally or physically—always wait till you feel rested. The best time for exercise is in the forenoon between breakfast and luncheon.

If overheated on arriving at the water, do not remove your clothes until the excessive feeling of heat has passed, and your breathing and circulation have become regular; never expose the skin to the direct action of the air when overheated.

Keep in motion after you have gone into the water; do not stand around chatting and lounging. As soon as you have swum sufficiently, dry yourself thoroughly, put on your clothes, and keep the blood in circulation by exercise.

Do not stay in the water too long—half an hour is long enough for the strongest man. More delicate persons will find that too much; for some, ten minutes should be the limit. Fifteen minutes is a good average for all.

If seized with a cramp, endeavor not to be alarmed, but strike out vigorously with the affected limb, or, turning on the back, extend it forcibly into the air. By paddling with the hands you can usually reach shore or keep afloat until assistance is rendered.

And, large boys, do not "duck" your weaker brother! The poor fellow might take fright and never again essay to learn; besides you might accidentally drown him; or he has a "big brother" perhaps.

In conclusion: if you have followed these suggestions not merely mentally, but in the "aqueous element," as the student would say, you will have become dexterous swimmers, and soon shall be able to join Byron in this stanza:

"How many a time have I
Cloven with an arm still lustier, breast more daring,
The wave all roughen'd; with a swimmer's stroke
Flinging the billows back from my drench'd hair,
And laughing from my lip the audacious brine,
Which kiss'd it, like a wine-cup, rising o'er
The waves as they arose, and prouder still
The loftier they uplifted me."

Harry R. Rose.

A FOREST OF BOUQUET-GREENS.

(Geological Talks.)

THIS morning I visited a fire-brick works. The "fire-clay" is mined at Queen's Run, about three miles up the river from the factory at Lock Haven. Though called "clay," it is, when mined out, a dark blackish-gray soft stone. This stone is shoveled into a crushing machine where it is rolled and ground up with water into a smooth fine dark gray clay. When it is ground perfectly it is shoveled out into a great pile on a table at which the molder stands. He sprinkles some dry brick dust on the table before him, takes up a large handful of the wet clay fresh from the rollers, and turns it over and over in the dust. Up comes a boy with a wooden mold, with spaces in it for three bricks. The man throws the ball of soft clay dexterously into the mold, the boy with a bowed cord quickly and neatly cuts off the unnecessary clay. While he does that the second and third mold are filled. The clay in these is trimmed too and the boy hurries away to empty his molds on to the "drying floor." As soon as this boy is gone another one is at the table to have his molds filled. So it goes on, hour after hour; the bricks are molded faster than I can describe it, or than you can read it. The floor of this great room is kept constantly heated so as to dry the bricks thoroughly. When these that we saw molded have dried somewhat, they are loaded in wheelbarrows and taken to a pressman, who feeds them into a press where they are compressed until they are fine and compact. As soon as pressed a boy lifts the brick carefully between two little boards and carries it away. So rapid is this press-work that one man and three boys are kept busy constantly at one machine. After a little drying on the hot floor these bricks are ready to be taken to the kiln. In this they are piled up carefully until the kiln is full. Each kiln will hold several thousand bricks. Fires are now kindled below the kiln full of brick and are kept going for five days or so, then they are let out and several more days are allowed for cooling. Then the

bricks are taken out. They are not like the common red building bricks, but are a little more "grainy" than those, and are of a yellowish white color. They are very valuable for lining furnaces or other places which must be exposed to great heat, as they are "refractory"—that is, do not melt or crumble on account of heating.

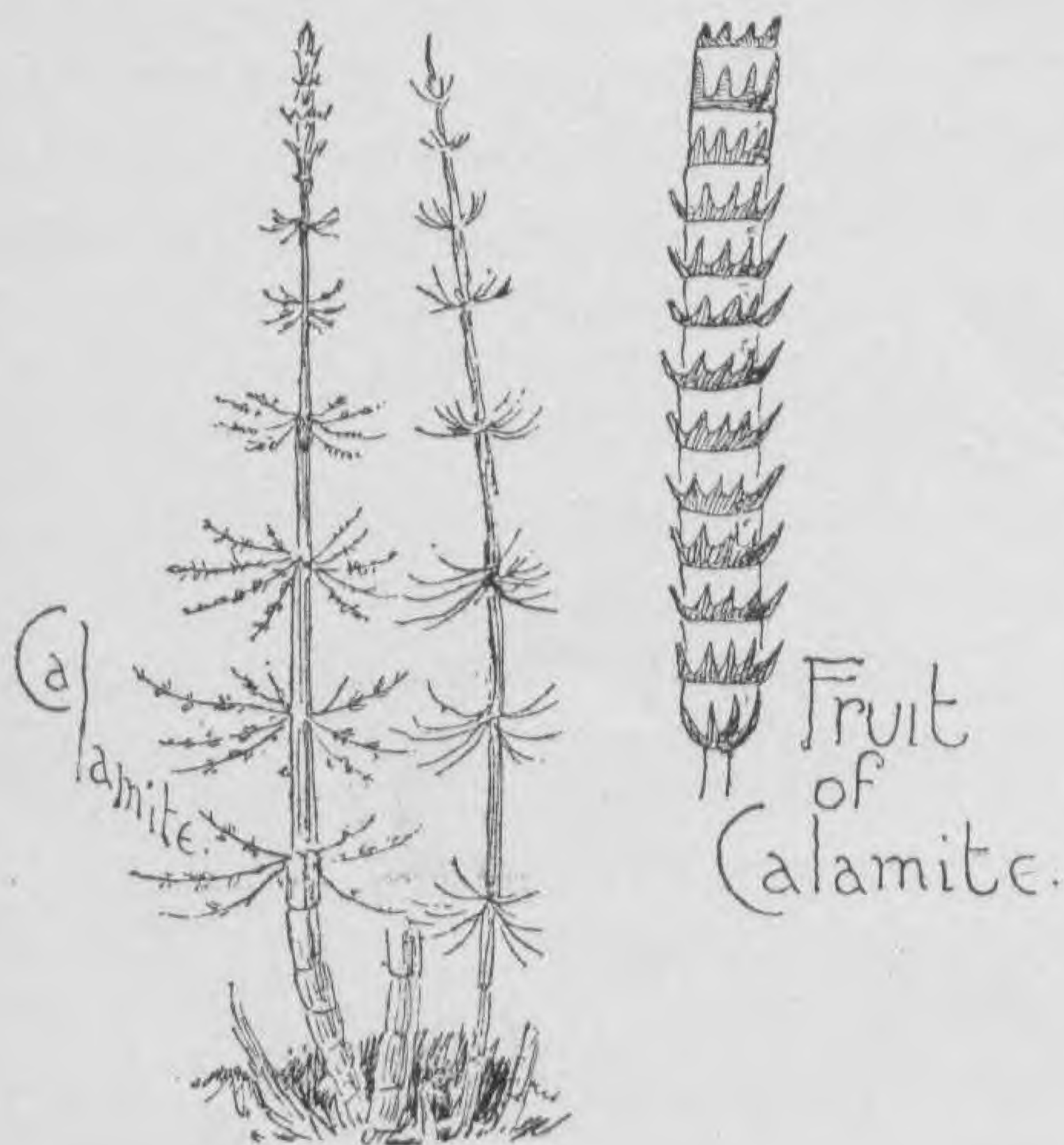
Perhaps you wonder what a fire-brick factory has to do with bouquet-greens?

Well, we may find out. You have seen bouquet-greens, haven't you? A pretty little



trailing green plant that grows in some woods. It is dryish and scaly and it wilts slowly so that it is used sometimes in bouquets or floral decoration. It is one kind of what are known as "ground-pines." The first ground-pines I ever saw were at Watkins Glen. The boy with me and I had gone up the glen and were on our way back. Presently on a rocky bank I saw a new plant among the moss and ferns, and I darted at it. There were signs everywhere: "All persons are forbidden to take moss or ferns." As this was neither, I took it. A

queer and pretty little plant it was—dark green in color, with straight stems rising six or eight inches into the air, covered all over on all sides with little dryish scaly leaves. These little stems were connected with a somewhat similar running stem on the ground. This



however had yellowish faded scales, instead of green ones. The upright stems were much given to forking into two.

Later on, I found in Pennsylvania a different kind of ground-pine—like a little tree not more than five or six inches high, lighter green, and with little cone-like scaly fruit masses at the top of some of the stems.

Again last spring, walking through a low wet meadow in Florida, I came across a third kind, larger, not so stout, not bushy, with very long creeping stems and erect stems a foot or so long and of a very light green color.

I have described these kinds to show you that ground-pines of one kind or another occur in most parts of the country. Look for them and you will probably find some kind in your neighborhood. If you do, examine closely and see, if you can, just how they bear their fruit. They have no true flowers or seeds, but bear “spores” in curious cases.

Little insignificant plants are these ground-pines—a “forest” of them would be no great matter. You could not find a forest of them either, if you looked the world over. Go back, however, through long ages, back through the

Quaternary, the Tertiary, the Reptilian Age, back of all of these, and we may find a “forest of ground-pines.” No imagination is needed to call it a forest. Here we are in it. The air is heavy and damp and warm—“muggy” so to speak. Our lungs would have to be made over if we were to breathe this atmosphere. It is full of carbonic acid gas, harmful to human beings. We stand here on an island of fallen tree trunks and are up to our knees in ferns and kindred growths. All around us is a marsh of fresh water, here and there forming open pools, but in most places filled with a dense mass of swamp-loving plants. In the open pools we see now and then a flash of light and a ripple of the water, as some ganoid fish or placoderm, covered with enamel, shoots by. Look at this old stump rooted in the ground. Within it is rotted and decayed, but the queer bark, tough and stout, remains. Poke away at the rotted wood within and see these snails and thousand-leg worms. There goes a little active fellow that we have just disturbed. He is a salamander—one of the oldest of his race. We become interested in the hunt, we start up half a dozen kinds, none very large, some bright colored, mostly quick in movement, running on land or swimming in water at need. They are the highest life we see, and the most beautiful. These woods do not echo the songs of birds, nor are they disturbed by the roar or cry of any mammal, nor are they the lurking-places of mighty reptiles.

We have studied the animal life of this forest enough. Let us look at some of its plant forms.

We see a few scattered tree-ferns, twenty feet high, with a line of great scars along each side of the trunk. At these scar-points leaf-stalks have been attached. There is, at the summit of the stalk, a crown of two great fern plumes, each ten feet long. A bud lies between them, which may, in another season, unfold, while the present fronds will drop away leaving a pair of new scars on the trunk. Notice that growth of tall slender stalks, thirty feet in height, close to the water's edge. They are queer plants—calamites they are called. They remind one of scouring rushes somewhat. They are jointed and break off at the joints easily. Each joint is ribbed by lines running lengthwise. Just as

in scouring rushes there is a ring of bristles at the end of each joint, so here, in calamites, there is at each joint a ring of leaves or of branches; which may themselves be jointed and supplied with leaves. There are a number of different kinds here, some branched, some simple; some slender, others fairly stout; some large, others small. These strange plants are, some of them, eighteen inches in diameter, but queerly enough they grow smaller near the lower end of the trunk than they are at the third or fourth joint up. They are not hollow like the scouring rushes, but are woody within.

While there are ferns all over the ground, scattered tree ferns here and there, and thickets of calamites near the water's edge and even in the water itself, and pines near the very outermost edges of the great swamp, the great bulk of our forest is made up of two kinds of plants, *Lepidodendrons* and *Sigillarias*. And these are so much like our bouquet-greens and club-mosses or ground-pines that we think of these at once.

Lepidodendron in particular is a true club-moss, but instead of being a few inches or a few feet high, it is a tree forty to sixty feet high and a foot or two in diameter. Its roots are peculiarly interesting and curious because of their great regularity in dividing and subdividing. Starting out with four roots, each of these divides into two, and then each of these into two more. The whole trunk of the tree is covered with scars, set closely together, and winding in spiral lines around the tree. These scars were left by fallen leaves, as we can easily prove by taking a leafy branch and rubbing off the leaves. See the fresh scars thus left. No trees now are so thickly covered on branches and trunk as this—though the little club-mosses show the same arrangement. At the end of some of the branches, just as in our little Pennsylvanian ground-pine, we find the fruit masses, scaly flattish cones of spore-cases. The bark is tough and stringy and does not decay nearly so rapidly as the somewhat soft and spongy interior. You see, we have in *Lepidodendron* really nothing but a giant ground-pine.

The *Sigillaria* is that tree of which you see a clump just before us. It is larger than the *Lepidodendron*—and is in fact the giant of the forest. Some in that clump must be eighty feet

high. It is somewhat like *Lepidodendron*, but you see it does not branch so much, and that the leaves are arranged in vertical lines along the trunk and branches. On this account the scars do not mark the whole trunk, but are arranged in rows and spaced off from one another. Their roots are somewhat like *Lepidodendron*, but their woody structure and their fruits are so different as to make us uncertain whether we should really consider them as ground-pines. The fruits are large scaly cones containing quite large nut-like seeds (or spores?) which have a thin membrane around them, that acts like the "key" of a maple-seed to waft the seed away to a new place for growth.

Truly our forest of "ground-pines" is a strange one. We have only noticed a few of the many plants it contains. All, however, have disappeared from the earth, and the forest itself perished many an age ago. It did not live in vain, however.

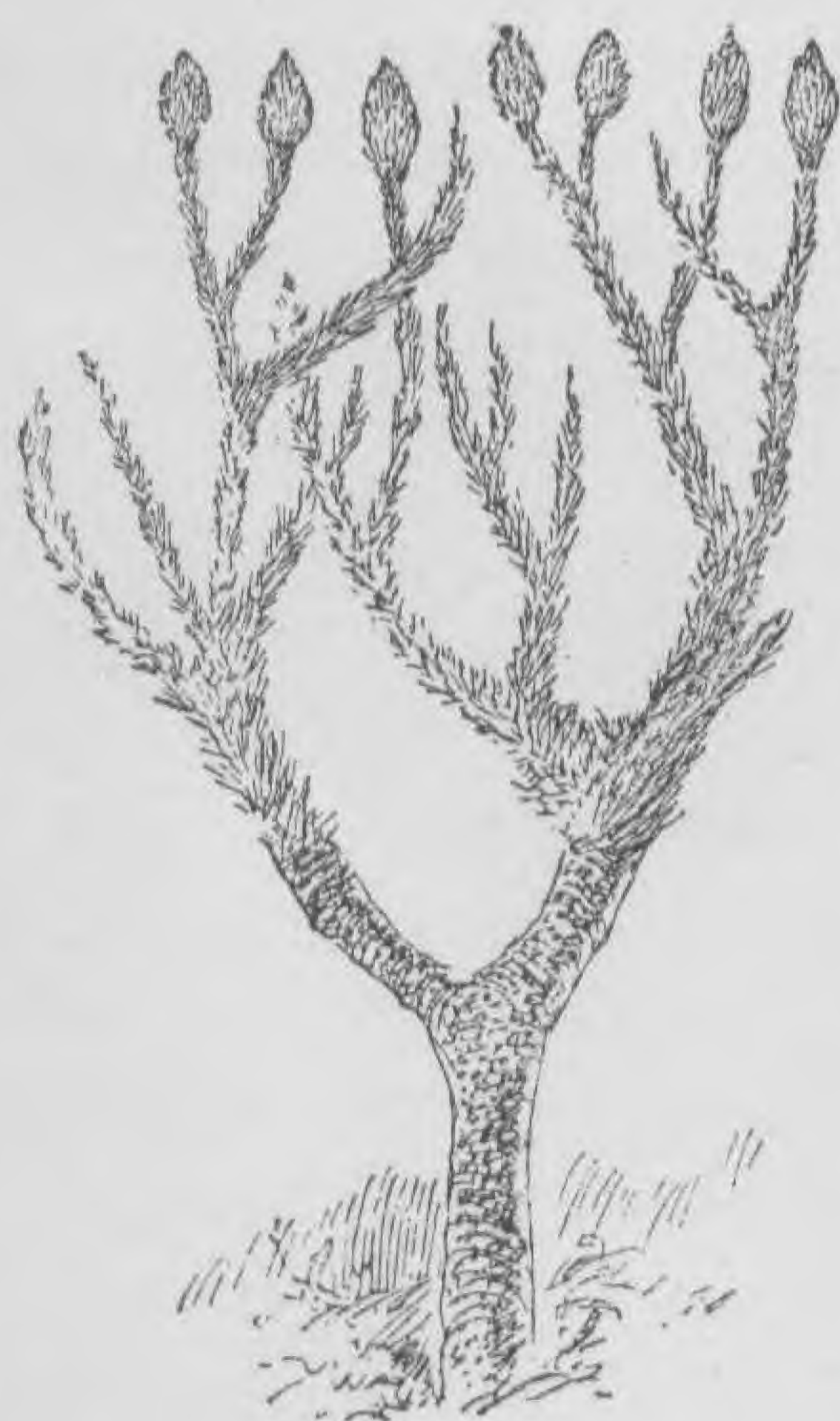
Were you ever at a "peat swamp"? There are many of them in our States. Let us visit one in New York or Massachusetts. The swamp is filled with a growth of thick matted moss. It is a peculiar kind. It grows to a great length, dying below but continuing to grow on above. It forms a spongy mass and appears here and there above the water's surface in hummocks, which are soft and yielding as we step upon them. Many other kinds of plants flourish here, but this is the most noticeable vegetation. Here, at the edge of the bog, take a spade and cut down through the moss—it gets firmer and more compact. Cut

down to the very bottom, perhaps it may be several feet thick, and look at the section. At top it is live and growing moss; then, a brownish or yellow tangle or matting of dead moss, which becomes more and more compact and dark in color until, at the bottom of the whole, we have a solid, dark brown or black material which can be cut out in blocks. This



is true peat. It looks very little like the moss, but is made from it by decay under water. Some of the moss material has gone off into the air, as gases of various kinds, but the greater portion of the plants remained and has been compacted and solidified into this peat. Peat is used as a fuel, and when it occurs in quantity is of much value. In Ireland, where some bogs of peat extend for miles, it forms the chief fuel and its cutting, drying and sale supplies occupation for many people. Most peat-bogs of to-day are moss bogs, yet in some regions peat is forming from other kinds of plants. In Great Dismal Swamp in Virginia peat is being formed from cypress-trees, and Lyell mentions localities where it is making from heather, grasses, and various flowering herbaceous plants. It is always, however, made from the decay of plants under water.

In some places in America where peat is dug, the crude peat is subjected to great pressure in machines. This makes it more compact and supplies a better fuel. Now what man does with peat-blocks, nature has done time after time with a peat-bed. She takes a peat-bog,



LEPIDODENDRON.

covers it up with a layer of sand or mud, and then by subjecting the peat to great pressure and some heat, drives off much of the gases in the decayed vegetable mass and makes from the peat a bed of bituminous or soft coal. With a greater pressure and more heat anthracite or hard coal is made, and even this may be

still further changed and by an immense application of heat and pressure a bed of graphite or "black lead" (the material of lead pencils) produced. There is a regular series of substances derived from vegetable decay under water, heat, and pressure — peat, lignite, soft coal, hard coal, graphite. Our old forest of ground-pines is

gone, but in its place, made from it, is a bed of coal.

You remember that our forest was a swamp forest? You remember, too, that this forest flourished just when the material for the Appalachian Mountain System was being collected in a vast trough? There was a slow subsidence going on which was interrupted now and then. When the sinking was fairly rapid sediment was being deposited in open water in this trough, but when it slowed or stopped vegetation encroached upon the swamp area and a bed of peat formed. Then the sinking would begin or gain again and this peat bed would be buried under sediments. So on, time after time, and as a result we get a set of layers — soil, peat, sediment, soil, peat, sediment. Of course the upper part of each layer of peat would be impure and mixed with mud or sand. Finally came that wonderful mountain-making time and these many beds of peat and soil and silt were raised and twisted and hardened. Here was pressure enough and heat enough to compact the peat, to drive off its lighter gases and to make it into black compact coal.

So much was it crushed and pressed and hardened that in much of the coal we cannot (even with the microscope) see any trace of its being made up of vegetable matter. Most layers of coal are underlaid by a peculiar shale bed and overlaid by a black slate. The under layer is the old soil in which the peat plants (or coal plants) grew and often the roots of the old *Lepidodendra* and *Sigillaria* can still be seen in it. This old soil-bed is "fire-clay" and the material for the "fire-brick" comes from it.

Of course in the old peat bed the upper part of the layer was loose and uncompact. When the bed was covered with silt branches, leaves, fruits, bits of bark, old trunks might become mixed with the mud or clay and be preserved. This happened often and the black slate above the layer is often full of delicate fern fronds, pieces of *Lepidodendra*, *Sigillaria* and *Calamites*, and thus we know what manner of plants lived and died and decayed in order to make this bed of coal. A very useful old forest — in its life time, it was always at work clearing up the atmosphere, taking out its carbonic acid and

making it fit for animals to breathe; in its death, its soil becomes fire-clay, its substance our most valued fuel, and its scattered branches and twigs object lessons to teach us of a time long past.

From a very early time such accumulations of plant decay have been going on. Peat, lignite, soft coal, hard coal, graphite are the result. Speaking roughly we may say that these are named in the order of their age — peat is the newest, graphite the oldest. We do not now know what kind of plants supplied the material for the great graphite-beds. They may have been somewhat like the coal-plants, but they may have been very different. There has been so much change in the rocks associated with the graphite that we can find no clear remains of that old flora. Many believe that they were not land-plants, but sea-growths. If this is so, the old-time vegetation of the ocean must have been an extremely luxuriant one. Tangled mats of coarse kelp and of delicate feathery seaweeds must have filled many a shallow bay.

Then next in the great peat-swamp times of the world's history came the time when stuff of the hard coals and the older soft coals was laid down. These were the great swamp-forests of ground-pines.

In later peat-bogs appear that strange group of plants known as Cycads — of old-fashioned plants the most curious — much like palms, ferns, and pine-trees, all in one.

Late in the Reptilian Age and in the Tertiary, there was in this country another great time of peat-swamps. In the West are vast deposits of lignite or brown coal. They show a very different vegetation from that of the old coal. Here there are no *Lepidodendra*, *Calamites* or *Sigillaria*. There are a few of the queer cycads and some ferns, but the bulk of the forest consists of palms, magnolias, sassafras, maples, poplars and other modern types. In the coal

age flowerless plants were dominant, now flowering plants are everywhere. One point to notice is that this time was one when a warm climate prevailed over North America and Europe. Even in Greenland palms and other plants loving a warm region grew.

And now again peat is forming over much of the world — but how changed the vegetation making it. Mosses and cypress, grass and heather. No longer are club-mosses the main material, nor cycads, nor palms or magnolias.

Notice the one important lesson.

The method of work and action remains the same as at first, but the material with which the forces act has changed repeatedly. Plants grow, decay and perhaps disappear. If however the decay takes place under water all does not disappear, but much remains, and in time may form a vast accumulation, which, under a certain set of conditions, may give a certain result. Probably not one species of plant lives to-day of those kinds that helped to make one of the beds of graphite that we know, but graphite-beds may still be forming. If our old forest of club-mosses and our layer of fire-clay can serve to show us how constantly nature works along a certain line to produce a certain result, even though she may have to use a different material, we shall have learned a valuable lesson.



Frederick Starr.



THE KINGDOM OF GRANADA.*

(Search-Questions in Mahometan History.)

181. After the expulsion of the Almorarides what Moslem government rose to power?

182. What great victory over the Christians was gained by the Moors in 1195?

183. Name a great defeat sustained by the Moors nearly twenty years later.

184. When did the rule of this Moslem power end?

185. When was the Moorish kingdom of Granada founded?

186. Who was the founder of the Granadan dynasty of the Beny-Nasr?

187. In what relation did Granada now stand to the kingdom of Castile?

188. How long did the kingdom of Granada endure?

189. State what marriage between two Spanish monarchs in the second half of the fifteenth century was destined to prove fatal to the remains of Moorish power in Spain?

190. What Moorish king a few years after this event refused to pay the usual tribute to Castile?

191. Upon which side did hostilities begin?

192. What was the first victory gained by the Moors?

193. What Moorish king who had driven his father from the throne was captured by the Christians?

194. What did they persuade him to do?

195. Who were the Abencerrages?

196. What internal dissension wasted the forces of the Moors of Granada?

197. When was Granada taken by the Christians?

198. Mention two noteworthy Moorish rebellions against the Christians which occurred more than a half century apart. How long did the second one continue?

199. Who was the last Moorish king and what was his fate?

200. By what king were the Moors finally

expelled from Spain. In what year of the Christian era was this expulsion consummated and in what year of the Mohammedan era?

ANSWERS TO JULY SEARCH-QUESTIONS.

141. In 1288 or 1299, by Othman or Osman I.

142. In 1356 under the leadership of Solyman Pacha son of Orchan the second Ottoman ruler.

143. Adrianople.

144. Bajazet.

145. By Timour the Tartar, commonly called Tamerlane. The defeat of Bajazet occurred in 1402.

146. Smyrna.

147. The capture of Constantinople by the Turks under Mahomet II.

148. Otranto.

149. Selim I. in 1516. The meaning of Mameluke is slave.

150. The repulse of the great Ottoman sultan Solyman at Vienna.

151. Persia, which in the great Mahometan schism embraced the Shiya faith, was constantly at enmity with the Turks who supported the Soonie belief.

152. At Azov and Astrachan in 1569, on which occasion the Russians were victorious.

153. At Lepanto, October 7, 1571.

154. In December, 1638, by Amurath IV.

155. The battle of St. Gothard which resulted in the total defeat of the Turks.

156. Candia.

157. Belgrade, which was taken by Austria but restored to Turkey in 1739 by the treaty of Belgrade.

158. The Wahabites, so called from their founder Abdul Wahab. Many of the Bedouin tribes still hold his doctrines.

159. In 1783, nine years later.

160. At Aboukir in Egypt, by Napoleon.

Oscar Fay Adams.

* See Washington Irving's *Conquest of Granada*.



INVALID COOKERY.

(Cooking in the Public Schools.)



THERE is no more important branch of cookery than that which is devoted to the sick room, and it shows wisdom on the part of those in charge at the schools that they have so emphasized this portion of the work, and have laid out the lessons pertaining to it so carefully.

Probably most of you know, from experience, how very greatly trifles are magnified when one is ill. Things that are not of the slightest consequence in

health, become very important when one is held down by sickness. Things that would be passed over usually, will then worry and fret one indescribably; while the least act that is kindly and thoughtful will be magnified in the same proportion.

One of the very first things I remember in my life, is being very ill with the measles. I could not have been more than three or four years old. I had a nightdress, which in addition to the ruffles that ornamented it, had a double row of stitching on the bands of neck and sleeves. I was particularly fond of that stitching, and I used to watch for the day when it would be the

time to wear that nightdress. I really grieved when I had to take it off to have it washed. One morning I had been bathed, and I was waiting for the clean nightdress; there wasn't much anticipation about it, for I had worn the stitched one the day before. I was lying listlessly, until the fresh robe should be brought. As it came my childish eyes caught the sight of stitching. I cried for very joy, I was so happy. The dear mother, who always did the sweetest and nicest things for her little girl, had sat up after the nervous, troublesome child was asleep, and had with her own kind fingers stitched the little robe. After that she stitched them all, and I know I got well much quicker for it. Now I dare say this seems a silly little story to tell, but it proves what I said—that trifles affect sick people much more than they do those who are well.

A friend was telling me, not long since, about an experience she had while ill. "I was so ashamed of myself," she said, "but I could not help it. My nurse had gone out, and I took the fancy that I wanted some cream toast. I asked my daughter, a girl of about fifteen, to make it for me. She did so, and when she brought it to me I cried just as hard as I could cry. She had put it on to a plate that I particularly hated, and the very sight of it took away my appetite. The child was as distressed as I was, for she really wanted to serve me. I could have boxed my own ears when I got better and thought it over, but it was a very serious matter at the time. However, it was a lesson my girl will never forget, and I am sure the next time she is called upon to serve an invalid, she will bring the best china plate in the house."

Now part of the teaching at the school is how

to serve as well as how to cook. The tray for the invalid must be carefully prepared; the tray cloth must be spotless, and the dishes nice and fresh. Then do not put on so much food that it takes away the appetite to look at it; it is easy to replenish if more is wanted. What you are to do is to coax the unwilling appetite, by literally making things look "good enough to eat." Take care that nothing spills in carrying, from cup, bowl or glass. If hot food is to be served, cover it so that it may not be cooled while it is taken from the kitchen to the sick room. A little heed will enable you to do all this, and you may be as adept at serving your invalid as you are in cooking for her.

Probably nothing—unless it be gruel—is oftener used in the invalid's room than toast. It seems a very simple thing to make and yet nothing can be more easily spoiled. It may be burned, when the scorched taste will make it unpalatable; or it may be so quickly done that the outside will be hard, while the inside of the slice will be clammy and consequently indigestible. It should be neither; but should be dry all through, and of a delicate golden brown. Stale bread should be used, and it should be cut in even slices, about a quarter of an inch thick; no thicker, certainly. When it is cut put it on a toaster or fork, and move it gently over the fire until it is dry; then hold it nearer the fire until it is a beautiful golden brown. If plain toast is wanted serve it at once, hot and dry. If plain water toast, or as it is oftener called, "wet butter toast," is desired, you will prepare the slices as for the dry toast; have a shallow pan with one pint of boiling water and one half a teaspoonful of salt in it. Dip each slice of dry toast quickly in the water, then spread with butter and serve very hot. Perhaps it will be milk toast your invalid will want; then you will observe the following rules: Prepare the bread, as if for the plain dry toast. For the "dip" you will use materials in the following proportion: One cup of milk, scalded, one half a tablespoonful of corn starch, or one tablespoonful of flour; one half a tablespoonful of butter, and one half a teaspoonful of salt. Melt the butter in a granite saucepan, add the dry corn starch or flour, mix well together, taking care that the mixture does not burn; add one

third of the milk, which has been heated in the double boiler, stir well as it boils and thickens, then add half the remaining milk, stir again, until it is smooth and entirely free from lumps; when it is quite smooth add the remainder of the milk and the salt. Pour this dip between each slice of toast, and over the whole. If you want the slices to be soft, dip them in hot salted water before pouring the dip or sauce over them.

You will follow these same directions in making toast for the family table. They are at once the easiest and the most correct. You will find them prove very nice, too, I am sure.

Perhaps this is as good a place as any to tell you that the cream for the toast is the "white sauce" or "cream sauce" that is used for so many purposes in cooking. Whenever you have a rule given you that says "make a white sauce," you may turn to this cream dip, and there you have it. Made a bit thicker it is used to mix croquettes, to cream fish, to pour over vegetables that you serve *à la crème*, as it is called. Like many another high-sounding article of food, it is very simple when reduced to its lowest terms. This sauce with egg boiled hard and cut up in it is "egg sauce;" with capers added to it, it is "caper sauce;" you may flavor it in as many ways as you desire, with lemon, onion juice, cayenne, the kind of seasoning you use depending upon the use you are to make of it. As you progress in your knowledge of cooking you will find that many an every-day dish is hidden under a fine, high-sounding name.

Of course it is quite necessary that you shall know how to make gruels, for they are much used in sickness. One of the most commonly-used gruels is that made from oatmeal. The girls at the school kitchen get to the point where they do this very nicely, and I think one of the most satisfactory features of the cooking exhibition, that was given last spring in connection with the sewing exhibition, was the "invalid cookery." There were glasses of beef tea and lemonade, molds of blanc-mange and bowls of gruel. More comment was elicited by these dishes than by any of the others. For some reason or other the visitors seemed surprised at seeing them; they evidently had not understood the full scope of the School Kitchen work.

But we must make the gruel, and not content ourselves with merely talking of it. Pound one half a cup of course oatmeal until it is mealy; the best way to do this is to tie it in a coarse cloth, and pound it with a wooden mallet. It is thus bruised without waste. Put it into a tumbler with cold water; stir it well and when the sediment has settled pour off the mealy water into a saucepan. Fill it again with water, stirring it, letting it settle and pouring off as before. Do this a third time, being very careful each time not to disturb the sediment in pouring. Boil this water, which you turned off for twenty minutes, stirring it often. Add one saltspoonful of salt, and if it is too thick add a little cream or milk. In making the gruel this way you get all the nourishing quality of the meal, as that mixes with the water, and only the hulls, or coarse indigestible portion is left. It is not a difficult piece of work, and I think you will find it very satisfactory.

The old-fashioned "milk porridge" is another of the invalid dishes that is taught. It is rarely one finds anybody except the trained nurse or the old-time housekeeper who makes it nowadays. I don't think it is so palatable as either the oatmeal or Indian meal gruel; but there are some diseases in which it is better for the patient than either of these. The doctor will always order it when he finds it needed, and all you have to do is to follow the school rule for making, and your invalid will get just what the doctor meant she should have. You will use two dozen raisins quartered, two cups of milk, one tablespoonful of flour and one saltspoonful of salt. Boil the raisins in a little water for twenty minutes; let the water boil away and add the milk; when this boils add the flour, which you have rubbed to a thin paste with cold water, and boil it for at least eight or ten minutes. Season it with salt, and strain before you serve it. You see how very simple all this is. Surely your sick-room cookery is not going to prove very difficult.

The delicate appetite of the convalescent will be tempted almost invariably by blanc-mange. There are many preparations from which it may be made—farina, corn starch or arrowroot; but that which is the most highly considered is made from the Irish moss; the genuine blanc-

mange, as it was originally made. You will take to a quarter of a cup of Irish moss one pint of milk, one half a saltspoonful of salt, and one half a teaspoonful of vanilla. Soak the moss in cold water until it is soft; pick it over carefully and wash it, removing anything that may adhere to it, so that it shall be perfectly clean. When it is thus prepared tie it in a thin lace bag, and put it into the double boiler with the milk; boil until you find that it will thicken when it is dropped upon a cold plate. That is your test for it. Then add the salt, strain it and add the flavoring. Wet a mold or a cup in cold water, and pour the blanc-mange into it; when it cools put it upon the ice until you wish to serve it; when you are ready for it turn it out into a pretty dish, and serve sugar and cream with it. Like the toast, the blanc-mange may be made in this way for tea, or for a dinner dessert. It is "none too good" for any of us, I assure you.

Irish moss also is used to make a jelly that is at once palatable and delicate, and is very grateful to the fever-parched lips of a sick person. Use one half a cup of Irish moss, four figs, one pint of boiling water, one lemon or orange, one third of a cup of sugar. Prepare the moss as for the blanc-mange by soaking, picking over and washing. Put it into the boiling water, add the figs and the thin rind of the lemon. Simmer until the moss is dissolved, then add the lemon or orange juice and the sugar, and strain into a cold wet mold.

Beef tea is an important adjunct in the list of invalid dishes. It is used to stimulate and nourish when the system has need of quick recuperation. This tea that is given here is the genuine extract of beef, containing all the strengthening properties, and the full nourishment of the meat. It is not always given in its full strength, but diluted with hot water until it is at the strength desired by the physician. In making it always select the juiciest beef, quite without regard to tenderness. Indeed, the tenderer the meat is, the less juicy it will be found. The lower part of the round is usually found to be the best for beef tea. It must be absolutely free from fat, only the lean meat being available. Cut the beef into quarter-inch dice-shaped pieces, and put them in a wide-mouthed bottle;

cover the bottle and set it on a tin in a kettle of cold water. Set this over the fire and heat it gradually. When it comes to a boil keep it gently simmering until the meat is perfectly white, looking like pieces of India rubber. Then strain out the juice, press it all out from the pieces of meat, and season to the taste with salt. In making your tea this way you see that you will get the actual juice of the beef; every particle is extracted, so that the nourishing properties are all obtained.

You should know how to make at least one or two cooling drinks for the sick room. Suppose we take lemonade and eggnog. For the first use to every lemon one tablespoonful of sugar, and one cup of boiling water. Remove

the peel in very thin parings, put them into a bowl, add the boiling water, and let it stand ten minutes, covered. Add the lemon juice and the sugar, stir it well to dissolve the sugar. If hot lemonade is desired, strain it at once and it is ready; if you wish it cold, set it aside and when it is cool, strain it. You may add ice if you desire, and the doctor allows it. To make an eggnog, you will separate the white and yolk of one egg, and beat the yolk with a tablespoonful of sugar until it is light and creamy; add to this one half a cup of milk; then beat the white of the egg to a foam, and stir it lightly into the beaten yolk, sugar and milk. It is a delicious and a nourishing drink. Try it some day, when hungry and tired, and see if I'm not right.

Sallie Joy White.

A FAMOUS NECKLACE.

(Stories about Famous Precious Stones.)

THAT the human neck is a suitable pillar to hang ornaments upon is so obvious a fact that it must have presented itself to the most rudimentary savage; and that it did thus occur to the early human mind we have abundant evidence. The prehistoric graves of Europe give up a greater quantity of necklaces to the antiquarian searcher than almost any other article, with the exception of implements of war. These necklaces are differently composed of beads of glass and of amber, colored pebbles and small gold plaques, while the white teeth of various animals and sea-shells seem to have been as general favorites with the prehistoric as with the contemporary savage.

It is not our intention to give an account of the many types of necklaces which have found favor in the eyes of humanity. To do so would be quite beyond the scope of these stories. We propose on the contrary to select but one—one especially notable amid the necklaces of the past. We may mention that the first diamond necklace ever known in Europe was one composed of rough stones which was given by

Charles VII. of France to Agnes Sorel. The fair lady's soft neck was so irritated by the sharp corners of the necklace that she said it was her pillory (*carcan*), hence the term *carcanet* which means a diamond necklace. The term fell into disuse about the time of the Revolution, and the proper name in France for a string of diamonds at that period was *rivière*. Nowadays they have restored the *carcanet* and kept the *rivière* as well, both terms being in common use.

Of all the necklaces in all countries and all times, incomparably the most famous was that one with which Marie Antoinette's name was so unhappily associated. This trinket is still disputed about even in our own times. It has a literature of its own and it is emphatically The Necklace of History. We will endeavor to make clear its singular career and ultimate fate.

In 1772, Louis xv. in the full tide of his infatuation for the worthless Madame Dubarry determined to make her a present that should be unique. It was to be a diamond necklace the like of which had never been seen before

and which was to cost two millions of livres. Accordingly in the November of the same year he gave the order to his jewelers, Messrs. Böhmer & Bassenge, who set about the job with glee. But it took both time and money to get together such a lot of diamonds. Of time there seemed enough, for the king was healthy and not old, and as for money friends were ready to supply it in ample store upon such fair security as the beauty and influence of Madame Dubarry. But Fate in the guise of small-pox intervened and upset all these calculations. In May, 1774, Louis xv. died and Louis xvi. reigned in his stead. By this time the necklace was complete, and what it was in its completeness let the pen of Carlyle tell us :

"A row of seventeen glorious diamonds as large almost as filberts encircle not too tightly the neck a first time. Looser gracefully fastened thrice to these a three-wreathed festoon and pendants enough (simple pear-shaped multiple star shaped or clustering amorphous) encircle it, enwreath it a second time. Loosest of all, softly flowing round from behind in priceless catenary rush down two broad threefold rows, seem to knot themselves round a very queen of diamonds on the bosom, then rush on again separated as if there were length in plenty. The very tassels of them were a fortune for some men. And now lastly two other inexpressible threefold rows also with their tassels will when the necklace is on and clasped unite themselves behind into a doubly inexpressible sixfold row, and so stream down together or asunder over the hind neck—we may fancy like a lambent zodiacal or Aurora Borealis fire."

Such being the doubly inexpressible description of this marvelous jewel we are not surprised that an awful difficulty should now arise to confound the luckless jewelers.

Who would buy it?

Not the young queen Marie Antoinette, who when offered it answered that being on the eve of war with England they needed frigates more than diamonds. Besides she had just bought, and not yet been able to pay for, two expensive diamond ear-rings.

This disappointed jeweler traveled all through Europe offering his trinket to the different queens and princesses, but none were rich enough to tie four hundred thousand dollars in a glittering string around their necks, so he returned to Paris with bankruptcy staring him in the face.

In 1781, when Marie Antoinette's first son

was born, the jeweler very nearly succeeded in selling it to Louis xvi., who wanted to make his wife a fine present upon so auspicious an occasion. The Queen, however, refused to touch the jewel when the king handed it to her as she lay in bed, and being very weak and ill, so that the least thing excited her dangerously, the doctor forbade mention to be made of this truly fatal necklace. The little dauphin, happily for himself, died while still a royal baby in his father's palace, and was succeeded by another boy less fortunate in his destiny. The luckless



"THE NECKLACE OF HISTORY."

(Less than one fourth the natural size. By permission of Mr. Henry Vizetelly.)

jeweler, who became almost a monomaniac on the subject of selling his necklace to Marie Antoinette, used always to attend with the glittering jewel at each happy event, so that the witty courtiers used to say whenever he appeared at Versailles :

"Oh! here's Böhmer. There must be another baby born!"

One day after about ten years of fruitless solicitation he threw himself at the Queen's feet and declared that utter ruin was come upon him through the necklace, that he would drown himself if she did not buy it, and that his death

would be upon her head. Her Majesty, much incensed, replied that she had not ordered the necklace and was therefore not bound to buy it, and ended by commanding him to leave her presence and never more let her hear about the jewel again. She thought the matter was finally ended. Poor Marie Antoinette! She was destined to be haunted through life by those terrible diamonds and to be asked about them at her trial and to be taunted with the theft of them by the mocking crowds who surrounded her scaffold. Such being the state of the case in 1784, we shall leave the Queen and the jeweler to follow the fortunes of two other persons who were made famous and infamous by the necklace.

The first was Louis de Rohan, cardinal grand-almoner of France and a prince in his own right. This person had been ambassador at Vienna where he had ridiculed Maria Theresa, Marie Antoinette's mother, and afterward a courtier at Versailles where he had criticised the Dauphiness, Marie Antoinette herself. By these double deeds he was cordially detested by the Queen who, like young people generally, was extreme in her likes and dislikes and vehement in the expression of her sentiments. Since the accession of Louis XVI. the cardinal had of course been in disgrace, and as royal favor is as the breath of life to the nostrils of a courtier, he was morbidly anxious to re-establish himself in the Queen's good graces. So much for the cardinal.

The fourth and by far the most important character is yet to appear on the stage. This is the Countess de la Motte. This individual was of the vampire type of idle good-for-nothings, who lived at the French court, and whose rapacity eventually caused such havoc in the most exalted circles. Madame de la Motte pretended to royal descent through a natural son of Henry II. Accordingly she added de Valois to her name, that being the family name of the reigning house which immediately preceded the Bourbons. She had been a roadside beggar when a child, but her great plausibility of manner, which later on became so fatal, had won for her the good graces of a lady about court who befriended her and had her educated. She grew up, was married to the Count de la Motte, and henceforward used all her talents to

push the fortunes of her family. A small pension only excited her appetite for more. She made the acquaintance of the Cardinal de Rohan. The cardinal, a man of about fifty years of age, seems to have been perfectly infatuated with the countess who, though not beautiful, was witty and very taking in her manners.

At length Madame de la Motte began to throw out hints about her acquaintance with the Queen and to suggest that she might be the means of restoring the cardinal to the royal favor. The cardinal believed implicitly in her intimacy with Marie Antoinette and built high hopes upon it, and not only the cardinal but many others likewise believed in it, and besought the adventuress's favor at the hands of Her Majesty. This may appear strange, seeing that the Queen and countess never exchanged a word in their lives; but at court where nothing is ever known exactly, but all things are possible, it is not easy to learn the precise facts about anything. An adventuress in the days of Madame de Maintenon is said to have made her fortune by walking through that lady's open door into the empty drawing-room and appearing for a few moments at the balcony. The courtiers saw her there, immediately concluded that she must be in favor with the unacknowledged wife of Louis XIV., and flocked about her with presents and flattery, hoping in return to profit by her influence.

By an equally simple device Madame de la Motte obtained the reputation of intimacy and influence with Marie Antoinette. She made the acquaintance of the gate-keeper of the Trianon and was frequently seen stealing away with ostentatious secrecy from the favorite haunt of the Queen. It was enough. People believed in her favor, and she was a great woman.

Then she took another step. She confided to the Cardinal de Rohan that the Queen longed for the diamond necklace, but had not the money to buy it, and feared to ask the King for it. Here was a chance for a courtier in disgrace. The cardinal, acting upon the hint, offered to conduct the negotiation about the necklace and to lend the Queen some of the money for its purchase. The Queen apparently accepted his offer, and wrote to him little gilt-edged missives mysteriously worded and of

loving import. The cardinal was exalted with joy. To be not only redeemed from disgrace, but to be in possession of the haughty Queen's affections was beyond his wildest hopes or aspirations.

Still acting upon the suggestions of the countess the cardinal bought the necklace, and, for the satisfaction of the jewelers, drew up a promissory note, which was intended to be submitted to Her Majesty and was in fact returned, approved and signed, *Marie Antoinette de France*. This letter came through the hands of Madame de la Motte in the same mysterious fashion in which the correspondence had hitherto been conducted. The cardinal thereupon brought the necklace to Madame de la Motte's house at Versailles, delivered it over to the supposed lackeys of the Queen, and went away rejoicing. Madame herself was feasted sumptuously by the grateful jewelers, who were profuse in their thanks for her aid. They even pressed her to accept a diamond ornament as a slight token of their gratitude! Madame de la Motte dining with her dupes, graciously receiving their thanks and magnanimously declining their presents, was certainly a spectacle for gods and men.

The cardinal, not content with his *billets-deaux* from the Queen, was to be further gratified by a midnight interview with Her Majesty in the gardens of the Trianon. A lady dressed in the simple shepherdess costume affected by Marie Antoinette did indeed meet him in a dark-shadowed alley of the garden, and as he was ecstatically pressing the hem of her garment to his lips she did present to him a rose which he clasped to his breast in speechless rapture. The lady of this scene and the Queen of the cardinal's fancy was a common girl off the streets, who bore a striking resemblance to Marie Antoinette. She was dressed up by the clever countess and was told to act according to certain instructions, but strange as it may seem she did not in the least suspect who it was she was representing—so skillfully was it all arranged by the astute Madame de la Motte who never let one tool know what another was doing for fear of spoiling her web of iniquity. The cardinal was totally ignorant of the imposture, and this although he knew the Queen

well; but the night was dark and Madame de la Motte executed a sudden surprise by means of her husband, so that the pair were separated before the superstitious Queen had occasion to use her voice, the sound of which might have aroused the suspicions of even the blinded cardinal.

In possession of four hundred thousand dollars worth of diamonds, Madame de la Motte's next difficulty was to sell them. This appeared to be impossible in Paris, for when she commissioned her friend Villette to sell a dozen or so, he was at once arrested as a suspicious person, and anxious inquiries were made as to whether there had been any diamond robbery of late. But no—there had been nothing of the kind. Nobody complained of having been robbed; court jewelers and cardinal were still in the happy anticipation of coming favors. The man Villette was the writer of the Queen's letters to the cardinal, he was also the lackey who had taken charge of the necklace for the writer of those letters. He was a very useful friend to Madame de la Motte until at last he turned king's evidence and explained the whole fraud.

The Count de la Motte next proceeded to London and there sold several hundreds of diamonds. Some stones he disposed of to Mr. Eliason the dealer who in after years it will be remembered had the Blue diamond in his possession. Upon the proceeds of these sales the la Mottes lived in Oriental splendor both in Paris and at their country seat at Bar-sur-Aube. This was in the spring of 1785, and until the first installment, due in July, became payable they seemed to live on absolutely oblivious of the danger ahead. "Those whom the gods wish to destroy they first make mad," is the classic proverb which must be resorted to in this case. On no other supposition can their remaining in Paris be explained. Madame used diamonds for her pocket money and tendered them for everything she wanted, exchanging one for a couple of pots of pomade.

The first payment not having been made, and the Queen having never addressed the cardinal in public nor ever worn the necklace, both prelate and jeweler began to be surprised. The latter wrote to the Queen an humble but mysterious letter expressive of his willingness to await

Her Majesty's convenience if she could not pay up punctually. Marie Antoinette read the letter, but not understanding it, twisted it up into a taper and lighted it at her candle. She then bade Madame Campan find out what "mad-man Böhmer" wanted. Madame Campan saw the jeweler, heard his explanation, told him the Queen never had had the necklace at all, and that it was some dreadful mistake, and then in the greatest distress besought her royal mistress to inquire carefully into the story, as she greatly feared some scandal was being effected in the Queen's name.

Hearing a rumor of trouble Madame de la Motte visited the jewelers, warned them to be on their guard (as she feared they were being imposed upon!) and then inexplicably remained in Paris, instead of escaping beyond the reach of the Bastille. The cardinal heard the rumor also; he was disturbed, but relied though with dawning doubt upon these letters from the Queen signed *Marie Antoinette de France*.

The fifteenth of August was and is a great day in all Catholic countries. It is the feast of the Assumption, an occasion upon which prelates don their most splendid robes and appear in all their dignity. During the reign of Louis XVI. it was an especially honored day, being besides a religious festival also the name day of the Queen. On this day in 1785 at Versailles, Cardinal de Rohan in his purple and scarlet vestments was suddenly placed under arrest, and thus humiliated was conducted from the King's cabinet through the crowd of amazed courtiers who thronged the *Œil de Bœuf* into the guard-room. The scene in the King's cabinet had been brief. The cardinal, summoned to the royal presence, found Louis, Marie Antoinette, and the first Minister of State awaiting him, all in evident agitation.

"You have lately bought a diamond necklace," said the King abruptly. "What have you done with it?"

The cardinal glanced imploringly at the Queen who turned upon him eyes blazing with anger.

"Sire, I have been deceived," cried the cardinal, becoming suddenly pale, "I will pay for the necklace myself."

More angry questions from the King, more faltering confused answers from the cardinal, and meanwhile the stern implacable face of the

incensed Queen turned towards him. The door opens, a captain of the guard enters: "In the King's name follow me!" says the officer, and grand-almoner of France, the cardinal-prince of Rohan is led off under arrest.

Thus far the action of every one concerned is comprehensible enough, but after this it becomes so extraordinary that it is no wonder if the enemies of the Queen pretended there was a dark mystery behind which had yet to be revealed. The unrelenting hatred of Marie Antoinette, which made her demand the cardinal's head in vengeance for his audacity in aiming at her affections, seems to have blinded her to every other consideration but that of ruining her enemy. Madame de la Motte was, it is true, arrested and thrown into the Bastille, but so bent were the royal party upon destroying the cardinal that they held out hopes of acquittal to the adventuress herself if she would accuse the cardinal. Nay, more, they offered to pay for the hateful jewel if Böhmer would give damaging evidence against the cardinal. Having thus completely put themselves in the wrong the case came on for trial before a bench of judges, who seem to have acted with perfect uprightness and impartiality. And this, too, when public feeling was running very high in Paris and the Reign of Terror only five years off.

All the perpetrators of the crime, except Madame de la Motte, confessed to their share in it; so the whole series of gigantic cheats and trickeries was exposed. The forger confessed to his forgery, and the girl confessed to the scene she had acted in the gardens of the Trianon. At length the cardinal had to admit to himself that the woman la Motte, who had bewitched his senses to the detriment of his fair fame, had also cheated his purse to an almost fabulous extent and had involved him in the crime of high treason which in days of more absolute power would undoubtedly have cost him his head. The cardinal was acquitted of the capital crime, but was condemned to lose his post of grand-almoner, to retire into the country during the King's pleasure, and to beg their Majesties' most humble pardon—a sufficiently severe sentence one would suppose for having been made a fool of by a designing woman. Marie Antoinette heard of the cardi-

nal's "acquittal," as she called it, with a burst of tearful rage which transpires through her letters to her sisters at the time. She laments in them the pass to which the world had come when she could do nothing but weep over her wrongs and was powerless to avenge them.

The rest of those concerned were variously dealt with. The Count de la Motte was condemned to the galleys for life, but he had already escaped to London, so the sentence did not much matter in his case. The forger Villette was banished. In his case the decree of the court was carried out in the old-fashioned way: he was led to the prison gate with a halter round his neck, where the executioner gave him a loaf of bread and a kick and bade him begone forever. The sentence on Madame de la Motte was sufficiently rigorous. She was to be whipped at the cart's tail, branded, and then imprisoned for life. The whipping was but slightly administered, but a large V (*voleuse*-thief) was marked with a red-hot iron on her shoulder: a fact which caused the jocose to say that she was marked with her own royal initial, V standing for Valois as well as for *voleuse*.

After a couple of years in prison the authorities connived at her escape, in pursuance it was believed of orders from Versailles. Marie Antoinette's unpopularity was, if possible, increased by the affair of the necklace, and the cardinal became a hero for a short time until others more conspicuous arose to overshadow him. Even yet, however, the unhappy necklace continued to work for evil towards the Queen. Safe in England Madame de la Motte wrote her Memoirs, which are nothing but a mass of libels and a tissue of falsehood all directed against the Queen. For private politi-

cal purposes it suited the Duke of Orleans to spread them as much as possible, for the great aim of his life was to discredit the Queen.

Madame de la Motte died miserably in London from the effects of a jump from a second story window which she took to escape from bailiffs who were arresting her for debt. All the money she obtained from the diamond necklace was not able to save her from want and misery. She was only thirty-four years old at the time of her death. The Count de la Motte lived on into the reign of Charles x. and begging to the last also died in want. The Cardinal de Rohan became an émigré after his brief hour of Parisian popularity and died in exile. The jewelers became bankrupt and the firm sank into oblivion.

And Marie Antoinette?

Ah well, she had nothing to say to the direful necklace. She never probably so much as touched it with a finger-tip during the whole course of her life, but she was taxed with its theft on her way to the scaffold, and a generation ago her memory was again loaded with the crime by M. Louis Blanc. Marie Antoinette has had every possible and impossible crime cast upon her by writers who sought in her person to degrade the idea of a monarchy, but slowly history is removing this dirt from the garment of her reputation. She was silly and headstrong in her youth and did harm by her thoughtlessness, but she was neither so silly nor so headstrong as many of the queens, her predecessors, nor did she do one tithe of the mischief that some of them attempted. She chanced, however, upon troublous times, and therefore everything she did was reckoned a crime, as also many things which she did not do, such as the stealing of the Diamond Necklace.

Mrs. Goddard Orpen.

THE SKY'S EYES.

THE tall sky looks — the stars his eyes —
 Upon the little earth;
 Is she absurd? for, see! his eyes
 Are twinkling with his mirth!

M. J. H.

SLEEP SLIPPERS.

(Ways To Do Things.)

SLEEP comes readily enough, with her swift feet of a goddess "shod with wool," to visit the pillows of young and healthful people. But she sometimes delays sadly in coming to comfort the aged or the invalid. So for the grandmamas or aunties who are delicate and easily chilled we can make a pair of wool shoes in which they may go to meet Sleep half-way. Indeed, any and all of our friends will find these simple and pretty slippers very acceptable. And a dozen pairs of them, in bright assorted colors, is a cheerful gift to send to a hospital ward; or to add through the year to one's stock of gifts made ready betimes for Christmas.

Simple as is the pattern, it has been carefully planned; and will be found to make a neatly fitting and comfortable shoe. A skein of Germantown wool, in white or some delicate or bright color, and a little Shetland wool or knitting-silk for the ankle edge, are the materials required.

With a bone crochet-needle make a chain of 8 stitches. Work, in short crochet, all around this chain, making 2 stitches in the 4th chain, so that there are 15 in the row. Work 3 rows around this little oval, widening at each end and at the middle — where the first widening was made. After these rows, widen only at

the middle until 20 or 22 rows are completed. Now work back and forth, omitting 11 stitches — 5 on each side of the middle stitch. These 16 rows are crocheted alternately on the back and the front loops of the work, so that the stitch may resemble the rest of the shoe.

Crochet together at the heel; and begin the ankle. This is quite plain, 6 rows in short crochet, missing a stitch at the corners where the 11 stitches were left. This narrowing shapes a slender ankle.

Then work one row of double crochet, for a cord or ribbon to be run in. This row is not narrowed, neither are the two plain rows of short crochet which follow it.

Now with the Shetland wool or the silk make a row of scallops thus: 1 short crochet, miss 1, 5 double crochet, miss 1, 1 short crochet. Repeat.

If silk is used, be careful to fasten it strongly and leave an inch of the silk run in at the wrong side of the work. A crocheted cord, or, still prettier, a narrow white ribbon run in around the ankle and tied in dainty bows, finishes the pretty gift which may be accompanied with the most graceful expression of your good wishes for a "good night and happy dreams."

E. Cavazza.

THE WEALTH OF THE HILLS.

(Geological Talks.)

WHEN I lived at Easton, there dwelt on the very crest of Chestnut Ridge an old German whose wife had commonly the reputation of being a witch. They lived in a lonely and miserable hovel, and the old man had cleared a little patch upon the rocks and cultivated a vineyard and raised a few vegetables. He knew how to make old tobacco "trim-

mings" up into what he assured me were good cigars, and he made wine from grapes off his own vines. He sold medicines and she dreamed dreams and "pow-wowed" the sick, and so in one way or another, they managed to live and to enjoy life in their own way. A little solitary lad lived with them, the child of the old people's daughter. I used to pity the little

fellow — he was only eight or nine years old — on account of his loneliness, with only the witch and the old horticulturist and a surly dog for companions. I used greatly to enjoy visiting this queer family, and the old man frequently gave me information of an interesting and startling character.

As I sat on the doorstep, the old man would stand before me, his heavy bowed old spectacles thrust up on to the top of his head and his whole body shaking with earnestness, for he was always very much in earnest and rarely spoke except of what was to him important. One of his favorite topics was the "hazel-stick" in which he had entire faith. He wanted to know if I had ever used it to find a vein of water or buried metal. I told him no; so he went into full descriptions to me — what kind of a stick to cut, when to cut it, how, and the fact that I must repeat a "charm" of words as I cut it so as to make "her" successful. Then he showed me how "she" must be held.

"Take her in your hands so, and walk over and over the ground and when you pass over treasure, she will bend down and point to it."

Then he told me how many times he had tried it, and that on one occasion "she" really did "turn" down over a spot right in his vineyard and that on digging there he found a great stone nearly as big as my head and very heavy!

I asked to see this wonderful treasure, but he had lost it — he was very sorry, for he felt sure it was very valuable! We then had quite a discussion concerning the veracity of the "hazel-stick" in which he assured me that it must be true in its showings for he "used the name of God in cutting her." At that time I was surprised to find this old superstition still in Pennsylvania, but I presume there are thousands to-day who have perfect confidence that a crotched hazel-stick, cut according to rule, if held by the ends of the crotch, will turn downward when carried over buried treasure or water.

Of course you and I have no belief in this stick, but don't you wish we had one that was reliable? What a tramp we would take over the hills and mountains, and how many wonderful things we would find in the way of buried treasure and what strange stories they would

tell. Imagine that we have one and let us start. No danger but we shall find the treasures — plenty of them! We will pass the coal beds and the veins of black lead. They have told us their story. Nor shall we notice everything our stick leads us to, for time is short.

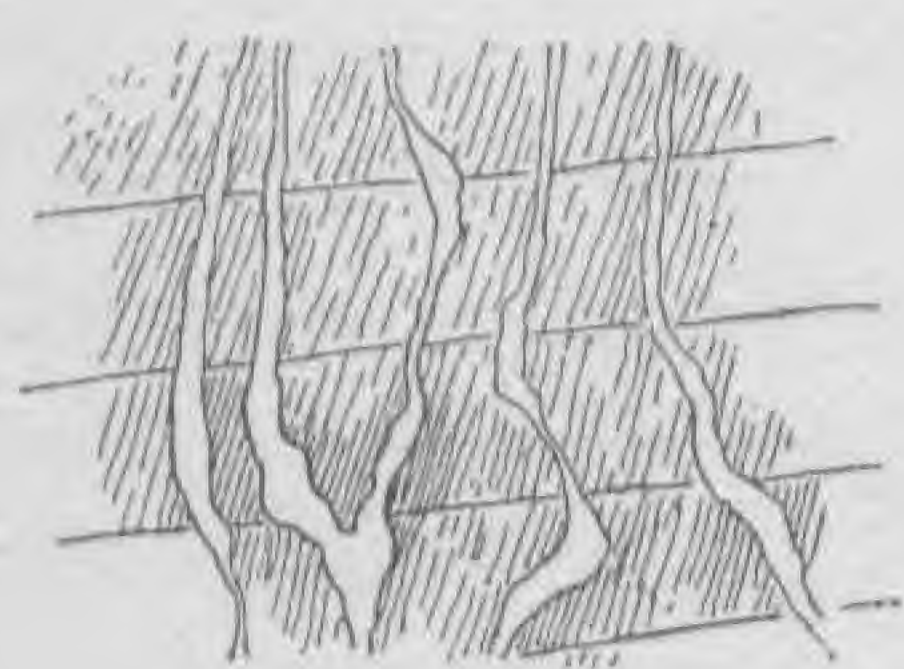
Start from the old witch's house on Chestnut Hill and cut across the beautiful valley, as straight as we can for the Blue Mountain — our old "Kittatinny." Keep the "Wind Gap" in sight and steer for it. Two hours' brisk walk and we are nearly there. Get out the stick now near the base of this hill. See how "she" turns! Treasure here. She keeps on pointing down, so certainly we are over something precious. We are not the first discoverers, however, for here you see a side-track leading from



this railroad to a great excavation yonder. It is a great square hole, hundreds of feet on a side and a hundred feet deep. It is like the excavation in the solid rock for the cellar of some great castle. Down there are derricks set up and dozens of men at work. They drill and blast out great blocks of the black rock, hoist them on the derricks, load them into little cars and push them along on little iron track-ways to those sheds yonder. Let us go there! See that man; he takes one of these great blocks, with a skillful blow of the hammer he splits it through, again and again, until he has broken it up into a score of thin layers. Another man takes these and carefully trims them neatly and squarely. In a short time they reduce that large mass, a solid stone, to a pile of neat roofing slates ready to be put on to your house.

Hundreds of such quarries in our American mountains give employment to thousands of workmen and yield enormous quantities of valuable material.

What are "roofing slates?" To go fully into their history would take long and would be a difficult discussion. Once, however, they were simply beds of mud. They have been changed to slates by tremendous pressure and heat and water. The pressure and heat have changed the shape of the old mud particles, rearranged



Veins in a
Slate
Quarry

them, and compacted the rock and developed a "slaty cleavage." So out of a comparatively valueless mud bank "metamorphism" has made a valuable slate quarry.

Let us now go to Vermont and with our hazel-stick in hand clamber around over the Green Mountains. "She" begins to turn here and we had better dig or see if some one else is at work here digging. O, yes! here on this hillside is an open quarry, not of black slate, but of fine white marble. It will pay you to look at it. You see it is white, granular, glistening in points. There is a great bed of it here in the mountain's flank. Where did it come from? How was it made? Metamorphism again. One time it was a bed of common limestone, and like other limestones it was probably made out of the shells of sea mollusks and the hard inner parts of coral animals. These animals lived in the sea and when they died their hard parts were ground up into a lime-sand, which became compacted into solid limestone rock. Before these hills were raised, simply limestone. Then, however, on account of the pressure and heat connected with the elevation the old limestone was metamorphosed — no longer dull in color and compact in structure, but white and with the particles rearranged and roughly crystalline. Ugly and perhaps worthless limestone changed into marble fit for the columns of palaces or most delicate interior work.

Our hazel-stick might find us a score more of remarkable cases where metamorphism has

made precious and beautiful substances from those that were ugly and of little value. A bed of sandstone mingled with clay and other impurities may be transformed into a crystalline rock studded with gems. Sapphire, ruby, garnet, are only the transformed worthless impurities of worthless beds of sand or mud. We have given enough examples — graphite, coal, slate, marble, gems — all are one type of hill wealth, all are due to the same great cause, metamorphism — by water, pressure and heat produced in the mountain-making process.

If now, returning to our old Germans, we go south two miles to Mammy Morgan's Hill, we may find a new kind of wealth produced in a different way. Here we are, at Mr. Lewer's, and we ask him if he knows of any buried treasure here, because our hazel-stick is very uneasy. Yes, indeed! He tells us that this hill is honey-combed by shafts and tunnels. Dozens of mines in every direction — iron, tons of it, taken out every week. Let us go down into one of the mines. Here is one where the cable is run by steam. A great wooden bucket has just been hauled up filled with ore. They empty out the iron and we ask permission to get in. Carefully! you need to balance right. Keep one leg out, and hold on to the cable firmly. Down we go! It begins to seem a narrow hole as we look upward and a deep one as we look downward. We think a little of what would happen if the cable should break! It seems a long descent, but at last — here we are! A man meets us, we put little lamps on to our hats and start out in the tunnel that runs at right angles to the shaft down which we have just come. We are two hundred feet under ground. The whole tunnel is lined with posts and boards to keep it from caving in, for this mine is not in solid rock, but in clay. It is damp and musty here, and sickly-looking white fungus grows in threads and tufts on the rotting wood. At last we reach the end. Here two or three men are working away with picks and spades at a "pocket" of ore in the clay. We chat with the miners a little — they are glad to see outsiders and they give us some specimens. The ore occurs in masses of various sizes, shapes, structures and colors in the midst of the clay. They are loose pieces pell-mell — no bedding or "vein" about

them. The clay is strange and may be of various colors, pink, brown, reddish or even white. Hill wealth? Yes, and in plenty. Not so very easy to explain either. We do, however, in some places find iron masses forming to-day and perhaps this was formed in the same way.

Iron is one of the most widely scattered substances in the whole world. In small quantities it occurs almost everywhere and in almost everything. What is needed then, in order to make a bed or a "pocket" of iron, is some means of gathering it from its scattered condition, and "accumulating" or "concentrating" it. This is done in many bogs and swamps. The clay of the swamp-bed contains some scattered iron. Water alone cannot dissolve it out. Decaying plants in the bog give out various acid gases and by their help the water takes up iron in solution — dissolves it out of the clay. If the swamps have an outlet, this dissolved iron is quite likely to be dropped at the lower end of the swamp, from the water, by the evaporation of the water or by the loss of the acid gases that had helped to dissolve or change the iron. At such places we do find iron forming to-day just like the iron from Mammy Morgan's Hill, and so we believe that in the same way this may have been made in the past. If iron is concentrated in this way we ought to find iron beds near coal — for there we had swamps, with clay beds at bottom, and with abundant decaying plants. If these clay beds under the swamps contained iron scattered through them, it should have been removed and deposited in a new place. As a fact we do find iron beds with coal beds often. So, too, notice the fire clay. Most clays when burned into bricks turn red. Why? Because they contain iron. Fire clay is not a red-brick clay. You see the iron that was in the clay beds has been taken out by water and deposited elsewhere in beds of iron ore. So we believe that all iron beds have been made in that way. As tending to show that iron is accumulated by water — where vegetable decay is going on (not formed from vegetable decay) — notice that where the greatest beds of graphite occur, there are also the greatest iron ore beds of the globe. The iron ore in these beds, however, is as unlike that of Mammy Morgan's Hill as the graphite is unlike peat and for the

same reason — both have been much changed by metamorphism. Iron is one of the great hidden treasures of the hills, and no doubt all of it was gathered up by water, aided by decaying plants, and then deposited out again later on.

This time let us try our stick on a Western mountain range. We find a different type of hill wealth from any yet seen. It turns, and look, there is a line of white traversing the rock of the mountain-side. The white stone is very hard, you cannot scratch it with your knife at all. It is a quartz vein. It is not a pure white but is somewhat "rusty" and dirty. Break off a bit with your hammer, and examine it closely. Here and there, you see, are little scales and dots or threads of yellow. Try these with your knife and you find you can easily scratch it or even cut it if you find a large enough spot. Hammer the little piece you cut off — it flattens. It is pure gold. Gold is generally found in this way in strings and threads and dots scattered through a vein of quartz. How did it get there? Well, gold is somewhat like iron, in that it is very widely scattered in minute quantities through all rocks and sediments. Why, all the clay that lies under Philadelphia contains a very little gold in every cubic inch. Some one has said that gold is built into the walls of the houses there — for every brick contains a little of the precious yellow metal. It is not easy for us to take out that scattered gold to use it. It would cost more than it is worth. But that is just what nature has done for us in every gold vein. Like an iron bed, it is the concentration at one place of metal that was widely scattered through the neighboring rocks.

The history of that vein is interesting. When these mountains were making the rocks were much traversed by cracks and crevices and fissures of all sizes and running in all directions. Water can soak through all rocks, going as readily through some as it will through a sponge.



Such water of course may dissolve out some of the rock material. If the water passed through heated rocks it would become hot and could dissolve more substances than if it were cold (dissolve out, not wear away, remember). These substances help it to dissolve out yet others. Thus water that had dissolved soda from a rock could dissolve out quartz — which it could not do readily without the soda or some other alkali. Once the quartz and the gold both were scattered through the rocks as grains or scales — hot waters passing through the rocks may have dissolved out alkali (soda or potash) and then the sand (quartz) and finally the gold in some combination or other. When water containing all these various substances in solution finally



reached a fissure or crevice it would by cooling and evaporation gradually deposit its contents on the side walls of the fissure until perhaps the whole crack would be filled and the vein finished. It did not always happen that a vein would be filled up — it might be coated on the side walls. If later water with different materials in solution should filter in, the vein might show vertical stripes of various minerals. Such a vein is called a "ribbed vein." Almost all metallic veins were made in this way, by infiltration of water with mineral matter in solution. There are, however, two other ways in which fissures may be filled and veins formed. Hot melted rock material may be forced into the crack from below. Of course such a vein is almost the same thing as a "dike." Again a mineral when heated may pass away as a vapor which as it cools may deposit the mineral as crystals on the sides of fissures through which

the vapor is escaping. Sulphur crystals are thus made in Sicily to-day.

While these two ways of vein filling are possible they are not the common method. Almost all veins are hot-water veins. And what thousands of such veins there are — think of the gold, silver, copper, tin, lead and quicksilver veins the world over — and then remember that only a few, comparatively, of these hidden treasures of the hills are yet known.

But there are other buried treasures in the hills besides metals and coal and building stones and gems. I have just come through Northwestern Pennsylvania and there is wealth! The whole strange aspect of the country tells of it. Great wooden derricks stand by thousands on the hillsides and summits. Hundreds and thousands of holes have been drilled in hope of "striking oil." And it has been struck! I don't know how many thousands or millions of gallons are taken away every year. Formerly they shipped it over the railroads to the refinery, but now they "pipe-line" it through. The oil is pumped into iron pipes, which lead it to great tanks shaped like those at the gas works. From there it runs through other pipes, miles and miles, to the cities where it is refined. Great groups of such tanks are to be seen here and there among the mountains.

The origin of the oil is very interesting. Like so much else it is connected with the making of the mountains themselves. Certain rocks of which the hills are made contained much decaying animal and vegetable matter. From these, by heat and pressure, oil was distilled. Certain black shales are the rocks from which it is derived. From these it has soaked out into sandstone layers and it is from these that it is pumped. In many cases it has probably soaked out into great cavities — natural oil tanks or reservoirs. In many places not only oil but natural gas, too, is found in these reservoirs and this is used in running furnaces, lighting towns, heating houses.

To-day there are in the United States, whole towns where they do not need to use a ton of coal or a gallon of oil, but where they can heat and light the whole place by natural gas. Pittsburgh, formerly so unpleasant on account of its dense black smoke, poured out from its thou-

sands of factory chimneys, is to-day clean and beautiful, thanks to its natural gas supply. Only lately have gas wells become of great use, but at a few places natural gas has been used for years. Fredonia, New York, has been lighted by the gas from a "spring" for about fifty years. This gas is a result of the same pressure and heat that produced the oil, acting on the same decaying animal matter in the rocks. The animals and plants of ages gone by are to-day furnishing us the materials for

lighting our homes and melting our iron-ores!

The hills are full of buried treasure. Riches that we know of are still unmentioned and doubtless many substances to-day unknown or considered valueless, may some day be found to be most useful. The old mountain-making time was a time of storing away and making treasure for the future — metals, building stone, gems, fuels, light, all laid up ready for man, as soon as he should be wise enough and industrious enough to find them out.

Frederick Starr.

MAHOMETAN LITERATURE.

(Search-Questions in Mahometan History.)

201. What sciences were especially cultivated by the Arabs?

202. At what yearly festival were the pre-Mahometan poets accustomed to recite their verses?

203. What are meant by the "Seven Suspended Poems?"

204. What is to be said of Arabic written prose before the time of Mahomet?

205. Under what dynasty did Arabic poetry reach its highest development?

206. What Arabic poet of the eleventh century furnished in one of his poems the model for Tennyson's *Locksley Hall*?

207. Under what Abbāsside caliph was literature most flourishing?

208. What Byzantine philosopher did he invite to Baghdad?

209. What book opposing the divine authority of Mahometanism was greatly approved by this caliph?

210. What science was especially patronized by this caliph?

211. For what is Geber of Seville celebrated?

212. When was the *Book of Songs* published and what is it?

213. What writer of Aleppo composed a noted *Life of Mahomet*?

214. What great medical work appeared in Aleppo at the end of the tenth century?

215. Who was Aricenna?

216. What is the standard grammar of the Arabians?

217. Under which reign did Ottoman literature attain great strength in the sixteenth century?

218. What Cordovan caliph collected a library of four hundred thousand volumes?

219. How was music esteemed by the Arabians?

220. When and where was writing-paper first made?

ANSWERS TO AUGUST SEARCH-QUESTIONS.

161. 710. In that year a descent was made upon Andalusia by Tarif.

162. The battle of Guadalete, which lasted a week. Don Roderick was the Christian leader.

163. In 719.

164. The battle of Tours.

165. Abd-er-Rahmān, the Moorish governor of Narbonne led the invading army and Charles, son of Pepin. The Christian general was called from his prowess on that occasion, Charles Martel or "Charles the Hammer."

166. At the Pass of Roncesvalles in the Pyrenees in 778.

167. Abd-er-Rahmān one of the few members of the Omeyyad family of Damascus who escaped the swords of the Abbasides in 750.

168. A rebellion of many of the citizens headed by several thousands of Mahometan theological students.

169. Toledo.

170. Between the Christians on the north and the empire of the Fatimite caliphs in North Africa.

171. That of Caliph with the style of "The Defender of the Faith of God." At this time the Abbasside caliphs possessed little influence outside of Baghdad and in consequence of this Abd-er-Rahmān could assume the spiritual title without opposition.

172. He was the greatest of the Spanish

Omeyyads and in the fifty years of his reign had brought his kingdom to its zenith of prosperity.

173. Almanzor, whom his Christian foes found almost invincible.

174. After Almanzor's death in 1002 the country became a scene of anarchy and confusion and so remained for many years.

175. A body of North African fanatics who at the end of the eleventh century had subjugated nearly the whole of Mohammedan Spain.

176. In the twelfth century the Moors of Spain rebelled and expelled their Berber of Almoravide rulers.

177. Rodrigo Diaz.

178. King Alfonso VI. of Leon who in 1081 banished him from his dominions.

179. Under the Moorish king of Zaragoza.

180. In 1099.

Oscar Fay Adams.





NORMAL TRAINING.

(Cooking in the Public Schools.)

IT has been quite impossible, within the limits of these chapters, to give the entire work of the school-kitchens for a year, but if I have been successful in even indicating what is done in the line of accomplishment I shall be glad. I hope you don't find figures stupid, because I wish to give you a few facts to remember, and use; for you know you are to be earnest workers in the endeavor to have school-kitchens introduced into every city and town in the country. Do you think this a very hard task? Well, if any one of you had the entire work to accomplish, you might hesitate before beginning it. But there are a great many of you to undertake the labor. Recall what I said not long since about forming public opinion. It would be impossible for any one of you to work for the establishment of school-kitchens all over the United States, but each one may use her influence in whatever place she chances to be, and it will be the united effort of so many that will tell in the result.

Of course it is quite necessary that you shall be in possession of facts so that you may present them to the people whom you wish to convince. It does no good merely to make a general statement—skeptical people have a way of demanding proof of your assertion—and I hope to give you something that shall serve you well in your work as an advocate of industrial training.

When the school-kitchens were first established in Boston, some of the people who had opposed them most earnestly said they would interfere with the regular school-duties; and that if so much time was given to outside work the scholarship would suffer. But it has not; on the contrary, teachers say that the girls come

back to their studies refreshed from the change of occupation. You will probably meet this same argument—it is a favorite one—and there is your reply ready.

After the school had been in operation about a year, all the mothers who had daughters attending the kitchens, were asked to give their opinion of the school and its results. Out of over eight hundred mothers who were seen, only two expressed themselves as opposed or indifferent. All the rest were pleased, and grateful for the opportunity given to their daughters.

Many of them said that they had not been able to give their girls instruction at home for lack of time, others could not risk the waste of materials, and they were glad to have them have the training because it was what every girl needed; every one testified to the good the teaching had accomplished and told with pardonable pride what the girls had done at home. Some of them had even taught their mothers better ways of doing things than they had ever known, and you would have been both pleased and amused to hear the proud tone in the mother's voice, as she told of her little girl's achievement. One poor Russian Jewess who could with difficulty express herself in English, said to the visitor:

"I wish much thank to the congregation for give my girl to make so much of good."

She did well with her limited English, I think.

And now about the cost, which is an important consideration. The greatest expense comes in the fitting up of the kitchen. I can really give you no idea what that will be, even approximately, but I am sure if you were to

ask Miss Homans, No. 26 Berwick Park, Boston, she would give you all the information you would need, and help you in any way in which she could, for no one is more interested in this work than she.

Then there would be the salary of the teacher; that would be the same as is paid to any grammar-school teacher. Sometimes two or three small towns that are near together employ the same teacher, each town paying a proportionate part of the salary, and in this way doing what they might not feel able to do if each one had to bear the whole expense. Here you see one of the practical workings of co-operation, concerning which so much is said nowadays. I can tell you this much about the cost of material, however: the cost for each pupil for a lesson is a fraction less than two cents. No one can complain much about that, and be reasonable. If you are asked if it is possible to keep the expense as small in other places as in Boston, you can assure your questioner that it is.

The Boston normal training-school for cooking-teachers provides that the teaching shall be uniform, and the course studied is to be adopted in every school, and this insures a uniform cost. This school has already graduated several pupils, and every one has found a place waiting for her when she has graduated. You can see by this that the work is being carried forward as rapidly as teachers can be got ready. The great danger is in beginning the work before you are altogether prepared. There is as much danger in undue haste as there is in delay. I am not altogether certain that there isn't more. In any important matter like this it is safe to make haste slowly. No matter how anxious you are to see this work begin in your own town, wait until you can secure a teacher trained in the normal school, and do not fall into the mistaken notion that anybody can teach cooking who can cook. A mistake at the beginning would be fatal, and you could never again awaken interest in the subject.

Some of you may be specially interested in this training-school and for such I will say a little more about what is done there. In the first place, every applicant for admission must be acquainted with the theory of teaching, and

it is considered a great point in her favor if she is a graduate of some Normal school. She should possess that particular qualification for the work—a liking for it; and she should determine to devote herself to it to the exclusion of all other branches, and be a power in her line of teaching.

There is no use in taking up any work in a half-hearted way; and if a pupil does not show herself disposed to do her best in the school, her continuance in the class is not encouraged. The teachers very soon discover if a student is lacking in the ability to do the work, and if there is any doubt of her ultimate success as a teacher of cookery she is kindly advised to turn her efforts in another direction. That is fair treatment, certainly, and kindly too. For the whole future of a girl may be spoiled by allowing her to make a failure when good advice, honestly given, might have turned her in the direction of success. And that is why I am so glad of the interest and care that the managers of this particular school give to the pupils.

When a student has taken the course, passed the examination, and received her certificate, then she may feel that she is well equipped for the work, for no certificate would be given her had she not won it, you may be sure. The course of study includes, beside cooking, lessons in chemistry by the most competent teachers, and with the practice lessons in both branches, there are frequent lectures by well-know specialists.

And now for the results with the pupils of the public schools. I have been often asked whether any real good was accomplished by the training—that is, whether the children did any of the work at home which they were taught at the school. I may best reply to this question by quoting from the report made by the committee on manual training. During one year the Boston Public School girls cooked over seventeen thousand dishes at home. There were two thousand under instruction, so you may easily reckon how much each girl did. Of course some always do more than others, that is so in everything, you know. But the pupils of the schools are required to tell the teacher what they do at home, and how successful the

work is, because only in that way is it possible to get at the results of the general work.

If you could see into some of the homes, and know what of comfort has come to them since the girls have learned how to cook well, you would be soon convinced that there is a moral as well as a practical side to the matter. At least one man has been led to give up his practice of going daily to the saloon at eleven o'clock for the drink of whiskey to "set him up," by the nice cup of chocolate and the corn-

cake which his little daughter gives him for breakfast in place of the sloppy tea and dry baker's bread which he used to have. It is much easier to be good when one is comfortably fed than when one is put off with insufficient and illy-cooked food. So you see you have a moral as well as a statistical argument.

And now, dear girls, whom I have come to love very dearly, even without a glimpse of your faces, good-by, and, as Tiny Tim says,

"God bless us, every one!"

Sallie Joy White.

THE TARA BROOCH AND THE SHRINE OF ST. PATRICK'S BELL.

(Stories about Famous Precious Stones.)

THE two jewels which it is now our intention to describe differ essentially from all those with which we have made acquaintance. They are not enriched with stones of any great value, but the setting of such pebbles as have been used is of a kind to render them unique. The most careful illustration conveys but a poor idea of the splendor and delicacy of the metal-work which literally covers these masterpieces of the goldsmith's art. We have nowadays a firm and in the main a well-founded conviction of our superiority in all things over the men of primitive ages. But in the presence of the Tara Brooch the most skillful jeweler of modern times is obliged to admit his inferiority. With all our skill it is impossible to imitate the delicacy of the workmanship and the wonderful grace and variety of the design displayed upon this truly royal gem.

Its history is of the meagerest. It was found in the month of August, 1850, on the strand at Drogheda, washed up from the deep by some especially generous tide, and left there for two little boys to pick up. The mother of the children carried their find to a dealer in old iron, but he refused to buy so small and insignificant an object. She then tried a watchmaker, who gave her eighteen pence (thirty-six cents) for the brooch. The watchmaker cleaned it up and

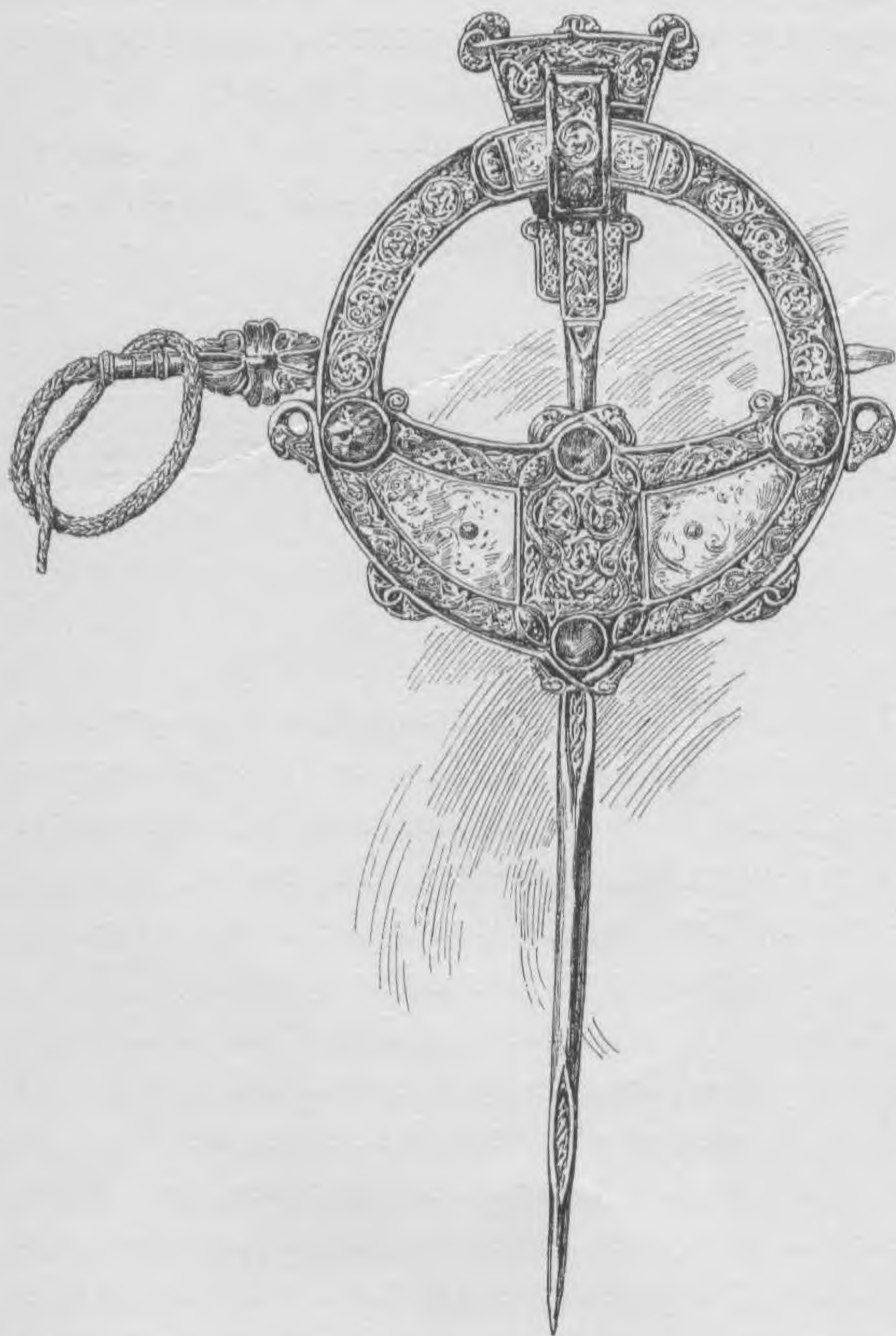
then beheld what he conceived to be a jewel of silver covered with gold filagree. He thereupon proceeded to Dublin and sold it to Messrs. Waterhouse, the jewelers, for twelve pounds (sixty dollars), which it must be admitted was a very fair profit upon his original outlay.

Messrs. Waterhouse exhibited far and wide this jewel which was by them called the Royal Tara Brooch — a name which serves well enough to distinguish it from other brooches, but which cannot be said to have any historical appropriateness. Whatever truth there may be in the legendary magnificence of "Tara's Halls," there is no reason to suppose that this brooch was ever displayed within its walls. These walls, whatever their nature, were represented by green mounds and grassy rath-circles, such as may be seen to-day, when the so-called Tara Brooch left the hands of the craftsman who made it.

After a time the Tara Brooch was sold to the Royal Irish Academy for two hundred pounds (one thousand dollars) which, though by no means an exorbitant price, was again a very fair profit for Messrs. Waterhouse.

The form and workmanship of the Brooch are of an early Celtic type, and it is believed by competent authorities to be extremely ancient, dating probably from before the eighth

century. At any rate, it may with confidence be placed before the eleventh century, for a certain design known as the divergent-spiral or trumpet-pattern, which though common before disappeared from Irish art about that period, is to be seen among its intricate ornamentation. The groundwork of the jewel is not silver, as



THE TARA BROOCH.

was at first supposed, but white metal, a compound of tin and copper. It is however the beautiful gold tracery laid upon this white metal which renders it so famous. No description can give an idea of what it is. The Tara Brooch must be seen to be understood.

If the Tara Brooch appeals to our imagination by reason of the mystery of its past, Saint Patrick's Bell has a contrary but even stronger hold upon us. It seems really to be an authentic relic of the Saint to whom it is ascribed, and at any rate it can be shown to have undergone a long and varied career. In the course of these narratives we have met with many kings

and queens; it is now our intention to introduce the reader to a saint. As it seems to be decreed by inscrutable destiny that no statement concerning Ireland shall ever be made without its being at once contradicted, we shall endeavor to shelter ourselves behind the wisdom of competent authorities. As Saint Patrick was an Irish saint it would be in the usual course of things for his very existence to be vehemently denied. It is thus denied by some writers who have been at pains to indite learned books upon the subject.

The following details concerning him are taken in the main from Dr. Todd's *Life of Saint Patrick*, and from the Saint's own works as edited and translated by the Reverend George Stokes, Professor of Ecclesiastical History in Dublin. Not being learned in Irish nor yet in Latin, we accept the translations of these able scholars.

As in the case of many great men the honor of being the birthplace of Saint Patrick is claimed on behalf of several places in England, Ireland, Scotland and France. The reader may choose which country he likes and he will find clever and ingenious arguments to support his theory. The Saint himself says that his father's name was Calpornius and that he dwelt in the village of Bannaven Tabernia, and the learned, if agreed upon no other point, are at least at one upon this—that they don't know where that village was. Saint Patrick's father had a small farm and seems to have been of noble birth, but the Saint invariably speaks of himself as the rudest of men, and deplores his want of learning. "I, Patrick a sinner, the rudest and the least of all the faithful and most contemptible to very many," is the beginning of his Confession, a work written by himself and containing most of the few facts known about his life.

At the age of sixteen he was taken captive, whether from Armorica in Brittany, or from Dumbarton on the Clyde, it is impossible to say, and carried "along with many thousands of others" into barbarous Ireland. This evidently occurred in one of those predatory expeditions of the Irish, or Scots as they were then called, which under the chieftainship of Niall of the Nine Hostages extended to all the neighboring coasts.

Dumbarton suffered repeatedly in this manner, a fact evidenced by the numbers of Roman coins found all along the coast of Antrim in Ireland. Dumbarton, an important military position, was the western limit of the Roman Wall constructed by Agricola, A. D. 80, to cut off the ravaging Picts from the rest of Britain, but the Romans, although so near, never set foot in Ireland.

Having been thus carried off to Ireland Saint Patrick became the slave of Milchu who dwelt in Dalaradia in a place now identified with the valley of the Braid, in the very heart of the county Antrim. As a slave the Saint's duty was to tend sheep, and six years he spent in this humble occupation. The fervent zeal and burning piety which were destined to exalt him among men began to show themselves even in his youth. He used to pray both day and night, he tells us, even in the frost and snow never feeling any laziness.

At the end of six years he escaped, made his way to the seacoast, and finding a vessel ready to start was at length suffered to embark. They sailed for three days and then wandered twenty days in a desert. This item does not help us as to the locality, for the coasts either of Brittany or Scotland, suffering as they did from the frequent visits of the Irish, were likely enough to be deserts. Patrick's first converts seem to have been the crew of this ship, for being on the point of starvation they appealed to the Christian to help them, and the Saint prayed, whereupon a drove of swine appeared; the grateful sailors "gave great thanks to God, and I" [Patrick writes] "was honored in their eyes."

After a brief stay with his parents the young man impelled by his zeal set out again for Ireland, determined to bring its pagan inhabitants into the light of Christianity. There is some variety of opinion as to the date of the Saint's arrival in the home of his choice, but 432 is the date commonly received, at which time he appears to have been something under twenty-five years of age. He first went to the north with the intention of seeking out Milchu his master. But this individual burnt up both himself and his house on the approach of the Saint in order not to be converted. So at least ancient annals declare. It must be confessed that this paganism was of the most robust type.

Having failed in this quarter he then proceeded to the Boyne. This is one of the most picturesque of rivers winding about among its wooded banks. Both sides of the river are now dotted with handsome and carefully-kept parks where ornamental trees and cows stand in pleasing and picturesque groups, while the smoothly-mown grass rolls like green velvet down to the water's edge. The water itself is limpid and clear as crystal, and in the deep pools the silvery salmon leap high into the air after heedless flies who come within reach. It looks very different from the days when Saint Patrick paddled up in his wicker and bull's-hide canoe. Probably the holy man himself would not recognize it; nothing is the same except the salmon, the flies, the limpid, clear water.

At Slane, a hill on the riverside about eight miles from its mouth, Saint Patrick built a beacon-fire. He was in consequence of this immediately summoned to appear before King Laoghaire who held his court on the neighboring height of Tara to answer how he dared light a fire, when according to ancient custom as well as by royal mandate all fires were to be extinguished. The interview between the Saint and the King ended if not in the latter's conversion at least in his tolerating the new comer, and eventually this occasioned the change in the religion of the whole tribe.

Thus began the apostleship of Saint Patrick, who in the course of his long ministry traversed most parts of Ireland undeterred by the dread of starvation or the fear of murder. He baptized many thousands of the natives, planted churches in numerous places, founded schools and established monasteries.

His most famous foundation is undoubtedly that of Armagh, the legend about which is preserved in a celebrated old Irish manuscript known as the Book of Armagh. The Saint begged of a certain rich man some high land upon which to build him a church, but the rich man refused to give him the hill, offering in its stead a lower piece of ground near Ardd-Machæ, and "there Saint Patrick dwelt with his followers."

Upon all the churches which he founded Saint Patrick is said to have bestowed bells, several of which under distinctive names have become

famous in history. One of these venerable relics, a small hand-bell made of two iron plates, something over seven inches high and three pounds ten ounces in weight, is known especially as the Bell of the Will of Saint Patrick. It is with this small rude object, not unlike the sheep-bell of to-day, that we have to deal.

Sixty years after the death of Saint Patrick another Irish saint, Columkill, obtained this bell from the tomb of the former where it had ever since lain on the Saint's breast, and by Columkill it was bestowed on Armagh as a most precious relic. This bell is mentioned under the date 552 by the compiler of the *Annals of Ulster*. A poem of a later date, though still far back in the Dark Ages, speaks fondly of the bell, saying "there shall be red gold round its borders," and many shall be the kings who will treasure it, while woe is to be the portion of the person or house or tribe that hides it away.

Armagh suffered much and frequently from fires, as was indeed natural in a village built entirely of wood as seems to have been the case during the first centuries of its existence. In 1020 it was burnt to the ground, all except the library alone. The steeple or round tower was burned with its bells. And again in 1074, on the Tuesday after May Day, it was burnt with all its churches and all its bells. But among these bells was not the Clog-Phadriug (the Bell of Saint Patrick). That was confided to the custody of a maer (keeper) whose honor and emolument depended upon the safety of the trust reposed in him. The keeper of the Bell was the head of the O'Maelchallans. The ancient poem already quoted refers thus to the elected keepers :

"I command for the safe keeping of my bell
Eight who shall be noble illustrious :
A priest and a deacon among them,
That my bell may not deteriorate."

The Bell of Saint Patrick was regarded as more and more holy as the centuries rolled on, and by the middle of the eleventh century any profanation of its sanctity was visited with the severest penalties. Under the date 1044 there stands this emphatic entry in the *Annals of Ulster* :

"A predatory expedition of Niull son of Maelsechlainn, king of Ailech, against Ui-Meith and against Cuailgne in which he carried off twelve hundred cows and a multitude of captives in revenge for the violation of the Bell of the Will."

Besides the extraordinary high price set upon the bell as evidenced by the number of cattle taken in revenge for the slight offered it, the record is interesting as showing the relative values of cows and men. It will be remarked that the horned cattle are carefully numbered as being precious, while the human cattle are roughly lumped together as a "multitude." This raid was followed later on by another in which "cattle-spoil and prisoners" were carried off in revenge for another violation.

During the episcopacy of Donell MacAulay who occupied the see of Armagh from 1091 to 1105, the sacred bell was inclosed in the gorgeous shrine which, though mutilated, still excites our admiration and envy. An inscription runs around the shrine; it has been managed with such skill that the letters seem to form an ornamentation rather than a break in the general design. The illustration which we offer our readers is that of the front of the shrine, showing also a portion of the side. The framework is of bronze fastened at the corners with copper fluting, and the gold and silver work is fixed to this foundation by means of rivets. The front is divided into thirty-one compartments, several of which have lost their ornamentations. A central decoration comprises an oval crystal while a little lower down appears another and a larger crystal. This latter object has been unaccountably introduced by some ignorant person, for it is manifestly out of place. It occurred to the present writer when inspecting the shrine last summer that it belonged to the centre of a neighboring shrine with which its setting agrees, and where its shape would enable it to fit exactly. On the side, below the knot and ring by which it is suspended, there are eight of those quaint Irish serpents, whose elegant tails curve and infold each other so intricately that it is almost as difficult to make out each particular snake as if they were in very truth alive and wriggling. Their eyes are of blue glass. The stones which still remain in their setting are of little or no value; glass,

crystal and amber appear to have been the only objects used.

But the beauty of the gold tracery is beyond expression. The photograph but poorly represents it, and the engraving falls still further below the original. It must be seen to be understood, and as the shrine may be examined in its case at the Royal Irish Academy any day, we can only hope that no visitor will ever leave Dublin without seeing it, no matter what else he may leave unseen.

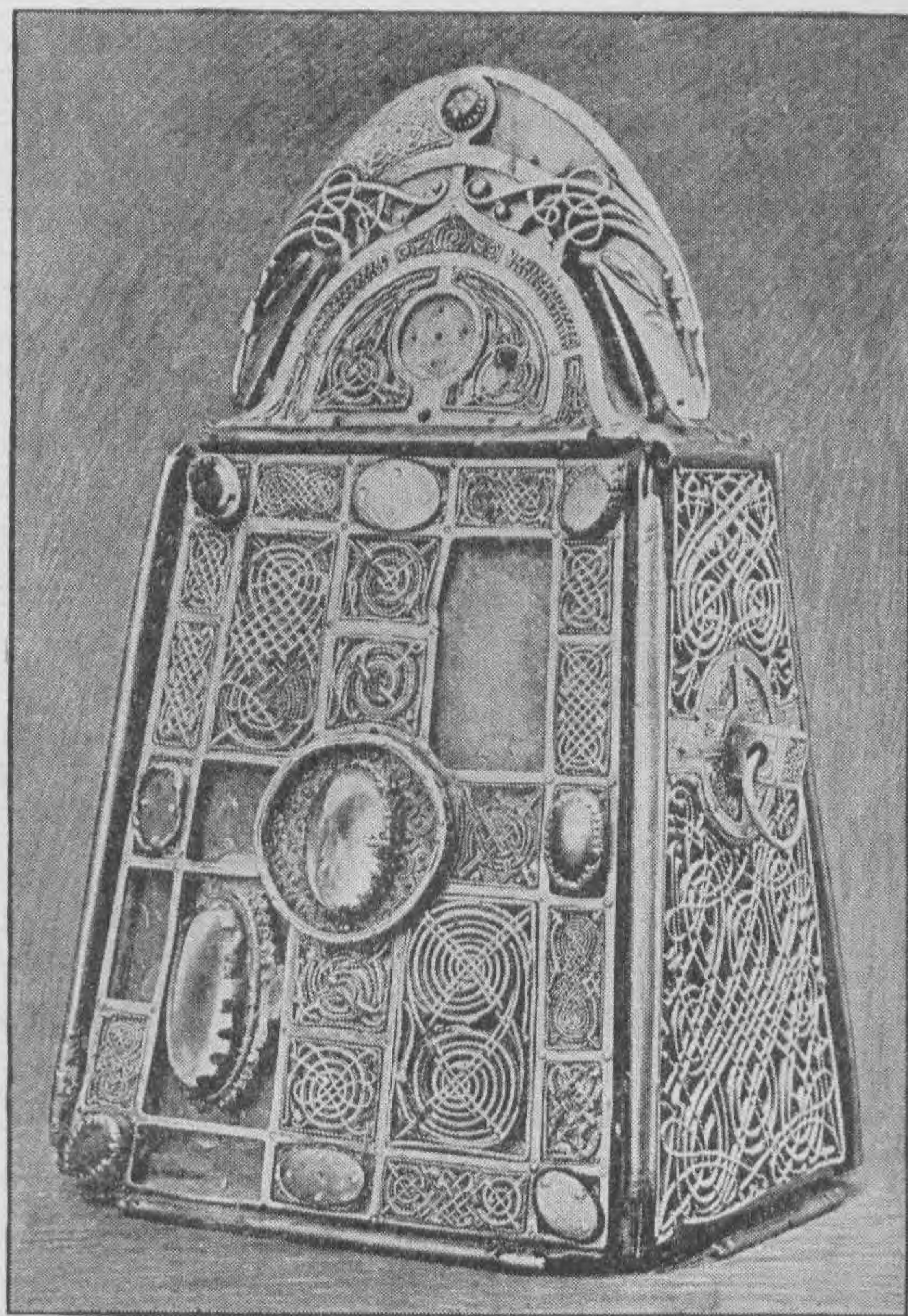
We return now to the history of the shrine.

The inscription according to the general usage of Irish inscriptions begs a prayer first for Domhnall O'Lachlainn, lord of Ailech (King of Ulster), secondly, for Domhnall the Bishop of Armagh, and thirdly for Chathalan O'Maelchallan the keeper of the shrine, and finally a prayer is also asked for Cudulig O'Inmauién the artificer who did the work. As long as the shrine lasts and as human beings possess a love of the beautiful the request of Cudulig will be answered in the admiration which all beholders will freely give to the work of his hands.

Domhnall the King is famous in the Annals as being "the most distinguished of the Irish for personal form, family, sense, prowess, prosperity and happiness, for bestowing of jewels and food upon the mighty and the needy." He died after a reign of twenty-seven years, aged seventy-three, in the year 1121—a splendid personage evidently, and one who might have caused the beautiful shrine to be made.

The O'Maelchallans appear to have kept their trust for generations; but from some reason now undiscoverable in 1356 the Bell of Saint Patrick was kept by Solomon O'Mellan, after whose death it again reverted to the former keepers. These enjoyed certain lands by right of their charge which were situate in the county of Tyrone near Stewartstown and were called Ballyelog, *i. e.*, the town of the Bell. In 1365 the O'Mulchallans were exempted from an interdict laid upon their diocese by the Primate, and this was done out of veneration for the sacred bell of which they were the custodians. Once more the bell migrated into the family of the O'Mellans and once again came back to the O'Mulchallans, whose name was undergoing a softening process, it will be observed.

In 1455 the keepers having become powerful and wealthy began naturally to be arrogant. They usurped the "firstlings of flocks," and got into trouble with the Primate in consequence. And now there comes a great gap in the history of the bell. From 1466 to 1758 there are no annals in Ireland which deal with it. Perhaps the inhabitants were too busy with their newly-arrived English neighbors and all their advent entailed to remember the bell. It continued, however, during all those generations in the same family of keepers whose name had become further toned down and was now Mulhollan. In 1758 Bernard Mulhollan died and Edmond



THE SHRINE OF ST. PATRICK'S BELL.

his son kept the bell in his stead. His son Henry was destined for the priesthood but became a schoolmaster instead. His school at Edenduffcarrick was attended by Adam Mac-Clean, a boy for whom he felt a great tenderness, and who returned his affection with gratitude. In the disastrous rebellion of 1798 Henry Mul-

hollan became implicated, and when that rising was put down he would have suffered for his rashness had it not been for the interference of his former pupil now become a wealthy Belfast merchant. All through life Mr. MacClean showed kindness and gave assistance to his old schoolmaster. When the latter came to die he accordingly left to his benefactor what he held most precious in the world. We give Mr. MacClean's own account of what Henry Mulhollan said to him on his death-bed :

"My dear friend, you were an old and valued scholar of mine : on one occasion you were the means of saving my life, and on many subsequent occasions of providing for its comforts. I am now going to die. I have no child to whom I might leave the little I possess, nor have I any near of kin who might prefer any claim to it ; in either case the treasure I possess and which I hold dear as life should not have left the family of Mulholland, in which it has been for ages and generations handed down. But I am the last of my race and you are the best friend I have. I therefore give it to you, and when I am gone, dig in the garden at a certain spot, and you will find a box there : take it up and treasure its contents for my sake."

Mr. MacClean dug in the place indicated and found an oak box within which lay the bell and its shrine and beside them a worn copy of

Bedell's quarto Irish Bible. Mr. MacClean had the precious relic in his possession for a number of years, but unhappily he did not at first keep it under lock and key. The result was what might have been foretold by any one acquainted with the depredations committed by the enlightened vermin known as "relic-hunters." Priceless bits of gold tracery were stolen by the servants and visitors until the cruelly denuded panels aroused Mr. MacClean to a sense of his danger. He then locked up the shrine.

Mr. MacClean willed the bell and its shrine to Dr. Todd, the great Irish authority on Saint Patrick, and by him in turn it was bequeathed back to the nation at large, who leave it to the care of the Royal Irish Academy as its keepers.

We have now traced the history of this bell back through the long vista of fourteen centuries. During most of that time it was venerated as a relic of great sanctity and the humanizing influence of this feeling must have helped these poor benighted savages of Ireland whom Saint Patrick came to teach and save. The religious sanctity of the bell is gone, but its mission is not thereby ended. The worship of the beautiful has also its humanizing and elevating influence.

Mrs. Goddard Orpen.

A PLEA FOR THE SPELLING-BOOK.

(Ways To Do Things.)

I WAS talking not long since with a gentleman in Boston, the head of one of the largest dry goods houses in the city, and he said to me, among other things in criticism of the boys, and girls too, who came to him for employment :

"I don't know what is the matter with the young people nowadays, but I rarely find one among them who spells well. I advertise for graduates from the public schools, and I require the diploma, as a reference, from either a High or a Grammar school, so I know that I am getting what I advertise for. Now they surely ought to be well grounded in English, but I don't believe

I find one really good speller among a hundred applicants."

That set me thinking, and I began making some inquiries among business men, and I found that to be the universal testimony. There was among the young people a prevalence of bad spelling. In fact, as one jocular merchant facetiously remarked :

"It seems to me that most of our young folks suffer more or less from 'bad spells.'"

"If they were the only ones who suffered," said another to whom this remark was quoted, "it wouldn't be so bad ; but we who employ them are the greatest sufferers, as we have

either the mortification of having sent off a badly spelled letter, or the trouble of correcting what we pay some one to do properly."

Now here is something for the young people who read *WIDE AWAKE* to consider. And not only the young people, but teachers and all who are interested in educational matters. It is a truth, and it is best to face it, in all its unpleasantness, accept it, and then go to work to find out what is the cause of it, and remedy it if possible.

If possible! Why, there is no reason in the world why children and young people out of school as well, should not spell correctly. When I was a little girl and went to school, it was considered a deal of a disgrace not to know how to spell. And what drills we used to have! I can remember the spelling lesson, usually the last recitation of the day, the hour at which the place of honor was allotted as head of the class. How eager and alert every one was, how ready for the words as the teacher "put them out" from the spelling book; how every slip was watched for, and with what a proud step the head scholar marched and took the place at the foot, ready to begin the contest for "getting up" the next day. It was something to be worked for, and it gave zest to the whole school-labor. I know very well what the argument against this drill is — that it is "a mere memory exercise," that pupils are taught to spell a great many useless words, and that much valuable time is wasted that might be given to more important things.

"Study a spelling lesson!" said a bright young girl to me the other day. "I never think of such a thing."

"Perhaps," said her wise mamma who was a listener, "that is the reason why you have so many 4 and 5 marks on your report instead of the perfect 6. You have never been able to explain it satisfactorily to me before."

The girl laughed in a little shamefaced manner and said, seeing that she had really betrayed herself, "Well, none of the girls do, and I spell as well as the rest."

"That won't do," was the reply. "When I was a little girl, only the best was thought well enough."

It is possible that in the old method too much stress was placed on the spelling-drill; still it

did its work, and the average result was far better than it is now. It may have been "all nonsense" to spend the time studying line after line and column after column of words, many of which would probably never be used; however there was, underlying it all, a genuine method; and any one who has thoroughly studied the spelling-book, still carries the rules unconsciously in his head. Take for instance the puzzling *e* and *i* used in combination. Isn't it hard work to remember how these troublesome little vowels are placed in relation to each other, when they are used together? Every mother probably has heard the appealing note in the voice when the question comes: "Dear me, which does go first in this word, the *i* or the *e*?" And if she was taught the good old-fashioned spelling how quickly the general rule comes that is given at the head of the long column: "*i* is placed before *e*, except when the syllable begins with *c*, then *e* precedes *i*." So the matter is settled — not by the new "word method," but by the despised spelling-book rule.

Now you must not think I am waging war against all the new methods. I am not. I think there is a good deal of common sense in the present ideas, but I think, too, that common sense may become nonsense — no-sense — when it is carried too far. There is always danger in going to an extreme, especially with a new idea; what is good in it seems so very good that people take it up with enthusiasm, and practically declare that because it has so much of merit, nothing else has. Instead of letting the new improve the old they push aside the latter entirely, and welcome the new before they have tried it.

Nor does it follow because I believe in the oral method and spelling-book, that I do not also believe in written spelling and the reading-book or history. I do. I believe in both. I think both eye and ear should be educated, that spelling should be taught by sound and by sight. I would not use either method exclusively. I would alternate the spelling drill, having it written one day and oral the next, and while I would use any reading-book for one I would certainly use the spelling-book for the other. Yet were I compelled to forego either, it would not be the memory drill of the latter

exercise. I have found it invaluable in my own experience. While it is true that many things are better for being "thought out," yet it is a necessity, in almost any pursuit, except possibly the merely manual, that one should have a retentive and a well-drilled memory. It can be cultivated even if one has not a good memory to begin with, and nothing does it more surely than the spelling drill. Even if one is not engaged in mental pursuits, it is a great pleasure as well as convenience to be able to carry facts in one's head. Indeed, the memory may be made a source of happiness and even comfort.

When I was a little girl, like my own daughters now, and like many another active, bright girl, I used to "commit to memory" very readily—probably because I had been always subject to a good spelling-drill. I was very fond of poetry, and as I had not many books, I used to learn all the good poems that came in my way, and I had my head stored full of them. When I was about sixteen, I had a very severe illness, that lasted for many months. I used to lie awake a great deal at night, unable to sleep from pain, and I can't tell what a comfort my head full of poetry was to me. I would lie by the hour repeating the poems I liked best over to myself, and they soothed many a weary time that would simply have been unendurable but for this happy resource.

I have talked with a great many teachers about the subject, and I find that the thoughtful ones among them believe as I do. It is a very narrow-minded person who doesn't see but one way. The principal of a large school in Yonkers, N. Y., told me that she had found it necessary to use both methods in her school. That neither one alone did the required work, but that both combined made good results. Her experience taught her, she said, that by the written method the pupils learned better to spell the short words in common use, while they needed the oral work to make them spell the longer words, such as they would have to use, and ought to know.

"Spelling-matches," or "spelling-schools," used to be a favorite form of entertainment, in which both the young and the old took part, and such fun as there used to be. In the country the spelling-match would be appointed for evening at the district schoolhouse. Everybody went, carrying candles or lamps to light up with. Either the teacher, or the minister, or lawyer, or the justice of the peace, just whichever chanced to be the "man of high degree" in the district, was chosen to "put out the words;" two of the best spellers in the district were appointed as leaders of opposing sides, and they by turn selected those whom they wanted. This was called "choosing sides." Of course the best spellers were chosen first. The opponents were arranged in two long lines, one on each side of the room; then the fun began. Words were "put out" from spelling-book or dictionary, and how the poor spellers would go down under them; by and by only half a dozen would be left standing. Then the excitement grew intense; it was an even race for awhile, then two or three would get bewildered by some word, perhaps a very simple one, but with a "catch" in it somewhere, as so many of the English words have. Then the excitement increased; the words fairly flew, it was neck and neck; but the fatal word came, which only one could spell, and he or she stood alone the victor in the contest. Wasn't it fun!

I wonder if it would be possible to have an old-fashioned spelling-match now? It wouldn't be half-bad fun to try it, would it? I don't know whether it would have quite the old-time flavor or not. Perhaps a little practice of that kind would cure the evil of which the Boston merchants, whom I quoted, complained. Of one thing I am quite convinced, after considerable experience in wrestling with the manuscripts of aspiring young writers and would-be journalists, it would be really a good thing if school supervisors, boards of education, committees and teachers, would unite in inculcating a spirit of respect toward the spelling-book.

Sallie Joy White.



"A BIT OF OLD OCEAN BED."

(Geological Talks.)

WHEN I was a boy of seventeen I went on a geological trip to Northern New York. It was to my mind in those days quite an undertaking and I felt much like a daring explorer in foreign lands. I arranged to spend several days at Watertown, where my explorations were mainly along the banks of the Black River.

My first "outing" was a tramp down to the caves of which there are several in the bluffs below the town. The fact that I was entirely alone impressed itself very vividly on me, while I was in one of the caves. I had two candles fastened with string to the end of a lath. With considerable difficulty I had found my way into one of the caves, clambering over masses of fallen rock, with which the floor was covered and which almost blocked the way. All at once out went my candles. I tried match after match, but the draught of air through the cave put them all out. I can well remember my sensations. On my way in I had hoped that the cave might be the home of wild cats and rattlesnakes. Now I hoped so no more, but felt sure that it was — the home of both of them. My flesh crept and I thought I should never see home again and wondered whether it would be many weeks before my remains would be found. I climbed out, however, some way or other — by a decided practice of my "sense of touch."

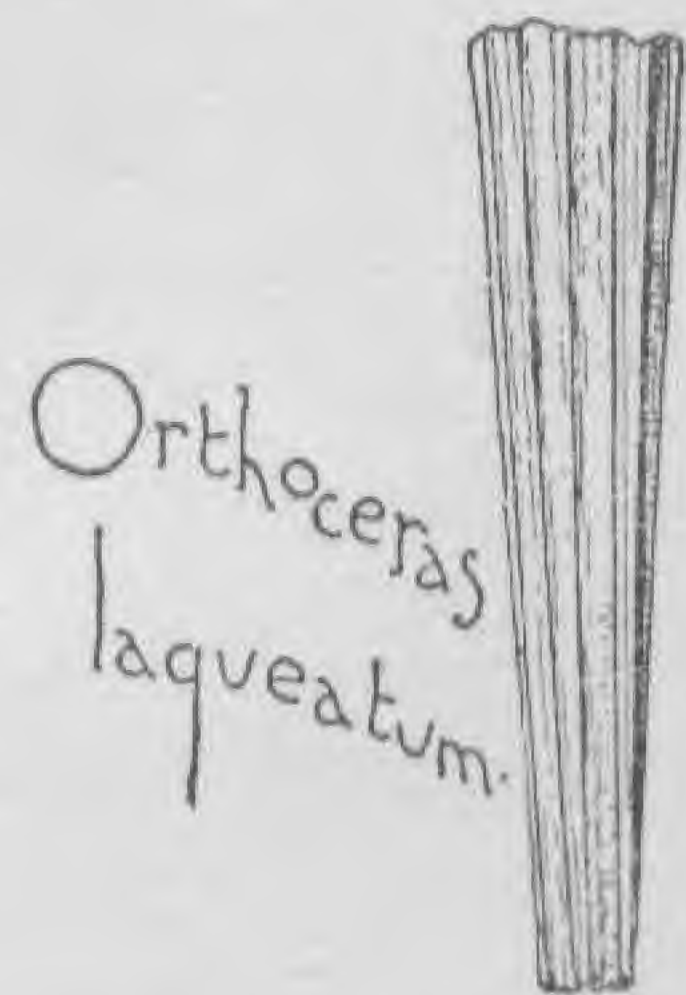
That whole trip was somewhat crowded with delicious terrors. The very next day I went down to the Falls, at the outer edge of the town. I took no path, but clambered down the bank along any trail I could follow. At times I had to jump from ledge to ledge of rock. Presently I found myself where my next leap must land me on the flat roof of a shanty that stood there in selfish solitude. I hesitated, not knowing what might result from jumping upon the roof of a man's house. At last I leaped, came down with noise and force and then waited a moment to see what would happen. All was still, so I crept to the edge of the roof, jumped down to the ground and looked to see what manner of

house this was. One look was enough! On door and sides were red cards and printed on them in staring black letters were the words "Small Pox." I did not stop to see how many inmates that pest-house held, but fled. For once my zeal as an investigator flagged!

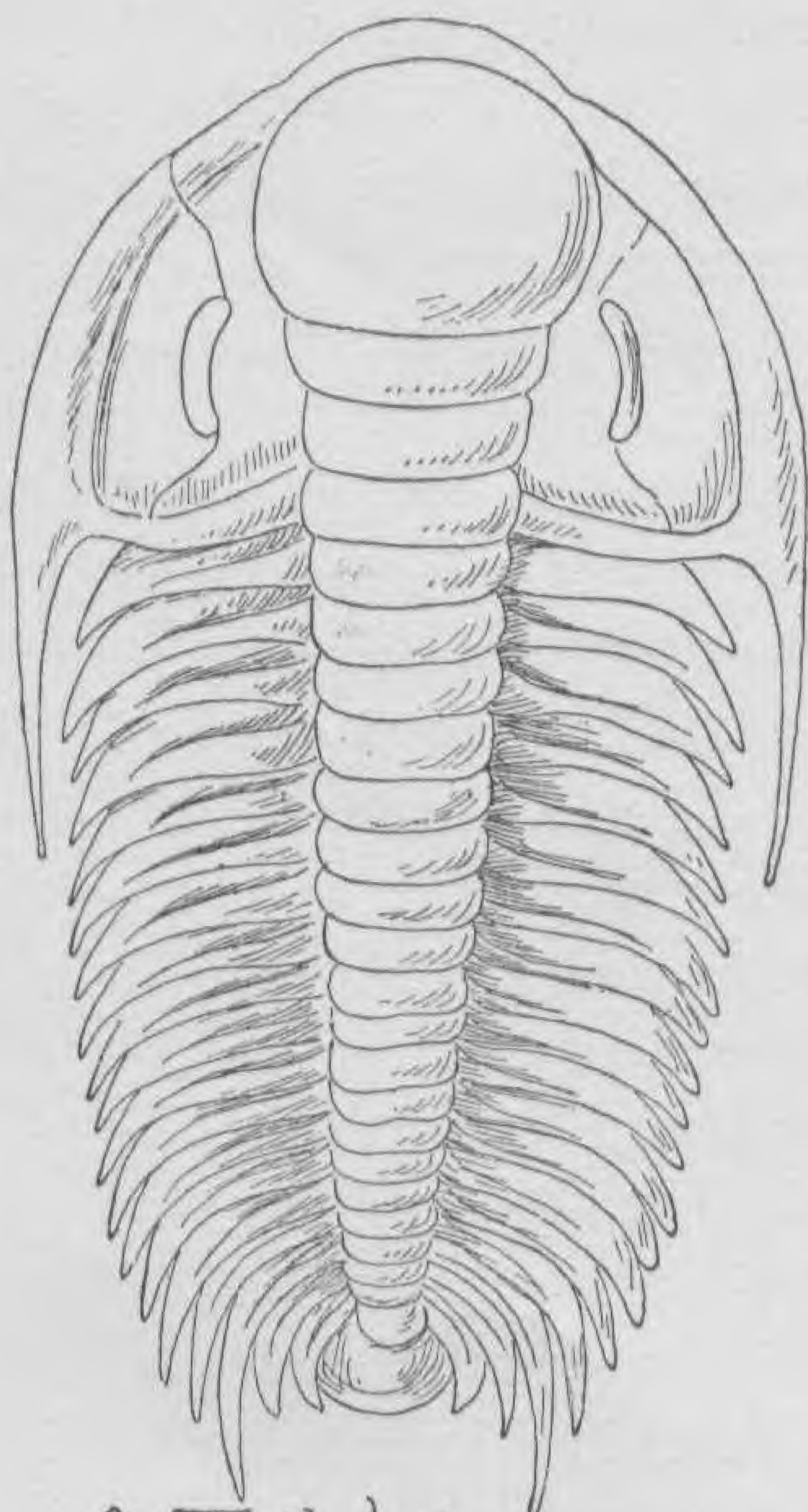
I did not give up my visit to the Falls. The bed of the river is of a dark limestone, quite compact and heavy. Just where the river makes its plunge as the Falls, is a flat surface of the rock of some little size. Upon this, clearly defined, were a dozen or so straight objects, marked out upon the black limestone in lines of white calcite or quartz. They had been worn down by the stream and water of rains so that they presented only sectional views. They were a foot long and two or three inches in diameter, tapering gradually toward one end. They were the shells of some old-time mollusks and this rock surface was a bit of an old ocean bottom. I have many a time found fossil shells and other sea life in rock beds, but never have I been so firmly impressed with the fact that a true old seabed was laid before me. The number of the shells, their large size, the way in which they were scattered about, all were very striking. This bed was that of the old Silurian Sea. These shells were of the highest life then living.

Let us first gain a clear idea of them and then we will notice a few other kinds of sea animals that lived in the Silurian Age. Thus we may see something of the life of a time far back of any whose life we have studied.

Orthoceras, meaning "straight-horn," is the name of these shells. There were many different kinds of them in the Silurian, ranging in size from a few inches long to ten feet, from less than an inch wide at the widest part to those that were a foot or more broad. They are gradually tapering conical shells. If we cut one



through lengthwise (as the erosion has done for us here at the Fall) we find the shells are divided by thin cross-partitions within, into chambers. We may be able to find that each of these little partitions has a small hole running through it. Passing through these holes there was formerly a muscular tube called a siphuncle. This tube of course passed through all the chambers but did not open into any of them. All the chambers but the one at the large end of the shell were filled with air, it contained the creature. He looked like a cuttle-fish, had great staring eyes, and a number of ugly arms



A Trilobite

surrounded his mouth, which was perhaps armed with bony plates for teeth. The mouth was connected with the muscular siphuncle. Let us see how this might be used. Probably in two ways: first, by taking in water into the tube and then forcing it out strongly, the orthoceras could drive itself backward rapidly through the water; secondly, by taking in water, the animal became heavier and would sink to the bottom of the sea, and when the water was forced out the animal would rise toward the surface. Cuttlefish of to-day are quite fierce creatures, when we compare them with other animals of their size, and the large orthoceras must have been

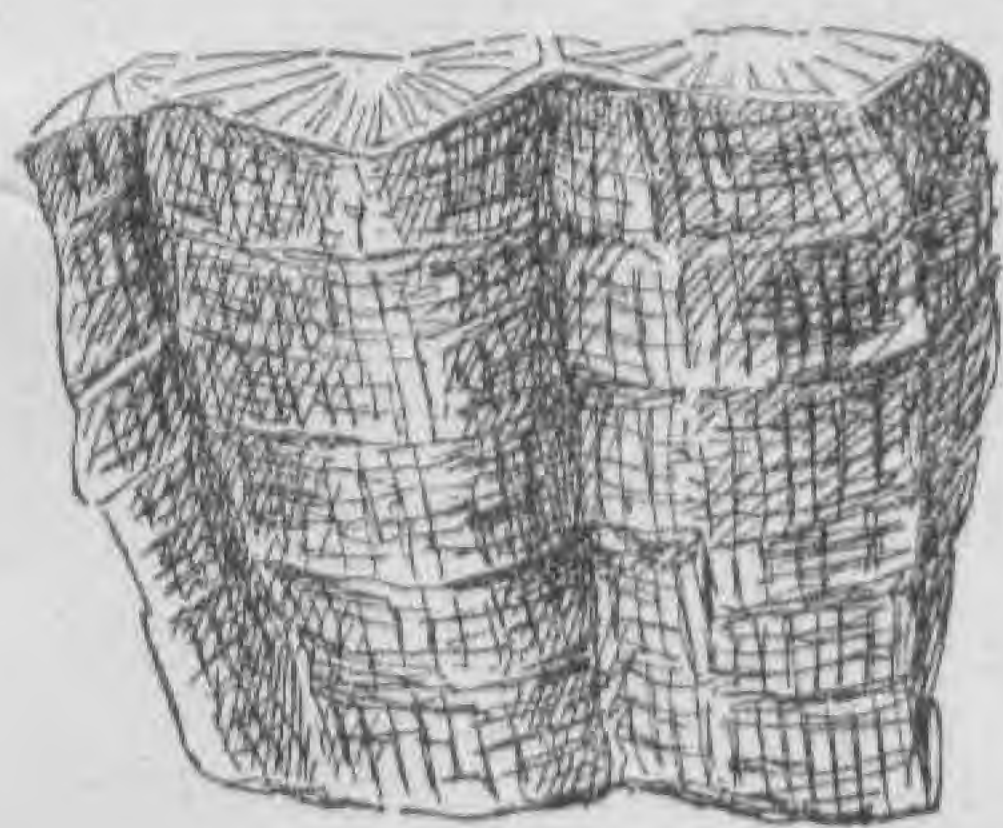
the tyrant of his seas. Later on in the Silurian Age there were some fishes living, but compared with these great mollusks they were fairly mean and unprotected. There were other forms of chambered shells living in the Silurian seas—some of which were not straight, but coiled—nautilus and nautilus-like forms. Orthoceras itself, however, is most interesting—it is an old, old type—none at all are known much after the Carboniferous, and they are not common after the Devonian.

If we had all the known life of the Silurian before us, three points would strike our attention. First, it is almost wholly invertebrate. The only vertebrates at all were fishes and they were not yet either very large or important. Second, the life is almost all marine. There was then little dry land and there were perhaps no fresh water or land animals. Nearly all the world was under the sea. There were some mountain ranges and the continents were already outlined as "banks" under shallow seas, but that was all. Water, water, everywhere, and water swarming with animal life. That is the third point—though low in type and marine in character, Silurian life was abundant and varied. Thousands of species are known, but it is probable that only a small proportion have been described as yet.

One of the most curious and important animals of this time is the trilobite. He was a queer fellow, but well protected. His kind swarmed in the Silurian waters and, like the orthoceras, perhaps died out with the Carboniferous. Of the several hundred kinds known all agree in general plan. They varied from half an inch to twenty inches in length. The general outline is somewhat oval. They were somewhat like crabs and lobsters and like these were protected by an armor of shell-crust. This crust is clearly divided into three parts; the head shield, the body joints and the tail. The head shield is almost in one piece and is somewhat semicircular in form. Upon it you can easily see two well-marked eyes, which like those of many insects and crabs are "compound." These eyes are so called because each one is so made as to present a great number of facets or lenses, each of which makes a distinct image of the object looked at. You know that

each of our eyes prepares an image of an object looked at — and, because they are so placed that these images differ a little, we get by combination of these two images an idea of solidity

Cup Coral.



that we could not have if we looked with only one eye. Think of the sight then of a compound eye. The hundreds of facets in such an eye, each makes its own image and by the combination of all of them there results a

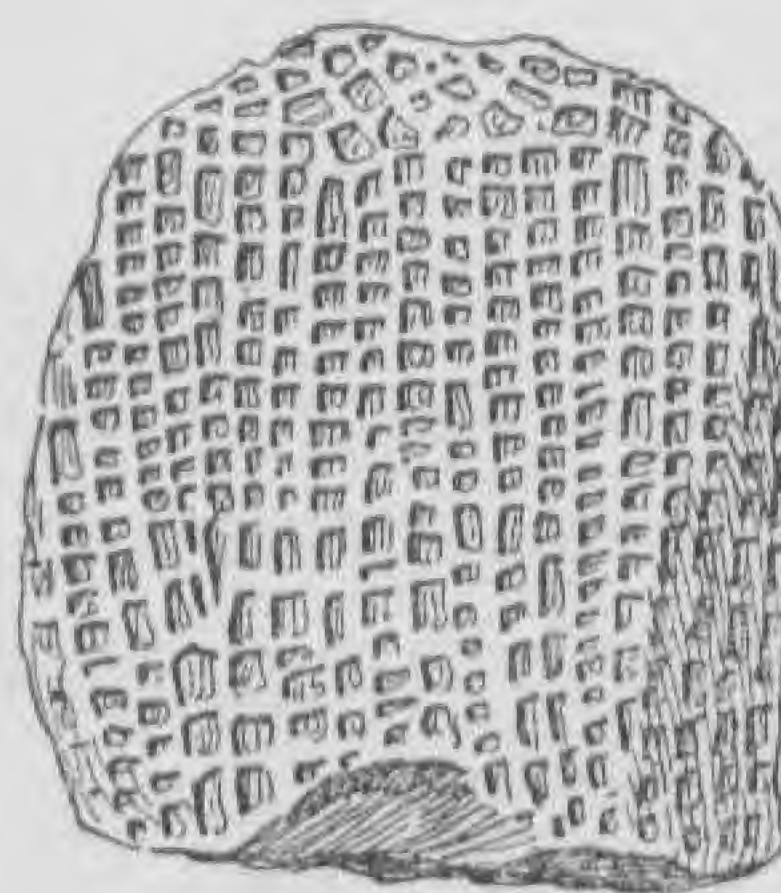
very perfect idea of shape and position. More than this, such an eye gives a wider field of vision than simple eyes like ours. So the trilobite was well fitted for seeing. Perhaps he was so surrounded by dangers that he needed to see in all directions at once! Between the eyes on the central portion of the head shield there is a swelled portion called the "glabella." This varies greatly in size, shape and markings. Next behind the head shield comes the body which is made up of a number of segments so joined together as to easily move upon each other. Then comes the tail, which may be simple and curved in outline or may end in a point or may be toothed around the margin. As the flesh decayed, after death, the head shield and the tail shield would be separated from the body and this would be broken up into its segments and scattered. So in the rocks we very often find separated heads and tails and single body joints. The trilobite's body is generally divided into three well-marked divisions called lobes — one central and one on each side. From this comes the name "trilobite" — "three-lobed." On account of the jointed structure of the body, a trilobite when frightened could roll himself up into a ball and thus would present a hard morsel to an enemy.

Trilobites thus rolled up are frequently found as fossils in the rocks. For a long time there was very little known about the under side of trilobites. The organs of the under surface were soft and delicate and readily decayed or were broken after the creature died. Recently, however, Mr. Walcott, by cutting hundreds and thousands of fossil trilobites into very thin cross

sections and very carefully examining them with the microscope, has shown that they had quite an elaborate set of organs for crawling, swimming and breathing. Careful studies, too, have been made of the eggs and young of trilobite found in the rocks, so that although they have been dead for so many hundreds of thousands of years we know more of trilobite's structure and life history than we do of many animals now living in the waters of the sea.

Corals were very common too in Silurian seas. Much of the limestone is composed of worn-out material of old-time corals. Sometimes masses of coral, entire and in the spot where they grew, may be found in limestone and occasionally a true coral reef of the olden time may be preserved for us in the rocks. Of these Silurian corals two or three kinds are particularly common and interesting. "Horn corals" or "cup corals" are known of many species. They are all more or less horn-shaped, tapering to a point at one end. At the larger end there is a cup-like depression. In life this cup was uppermost and the whole stony coral was covered with animal flesh. Around the upper edge was a fringe of soft and delicate fleshy feelers or tentacles, that surrounded the mouth. I suppose these animals were of various bright colors and in many cases, no doubt, the tentacles were of a totally different hue. A group of these vividly colored cup-corals must have presented a beautiful appearance.

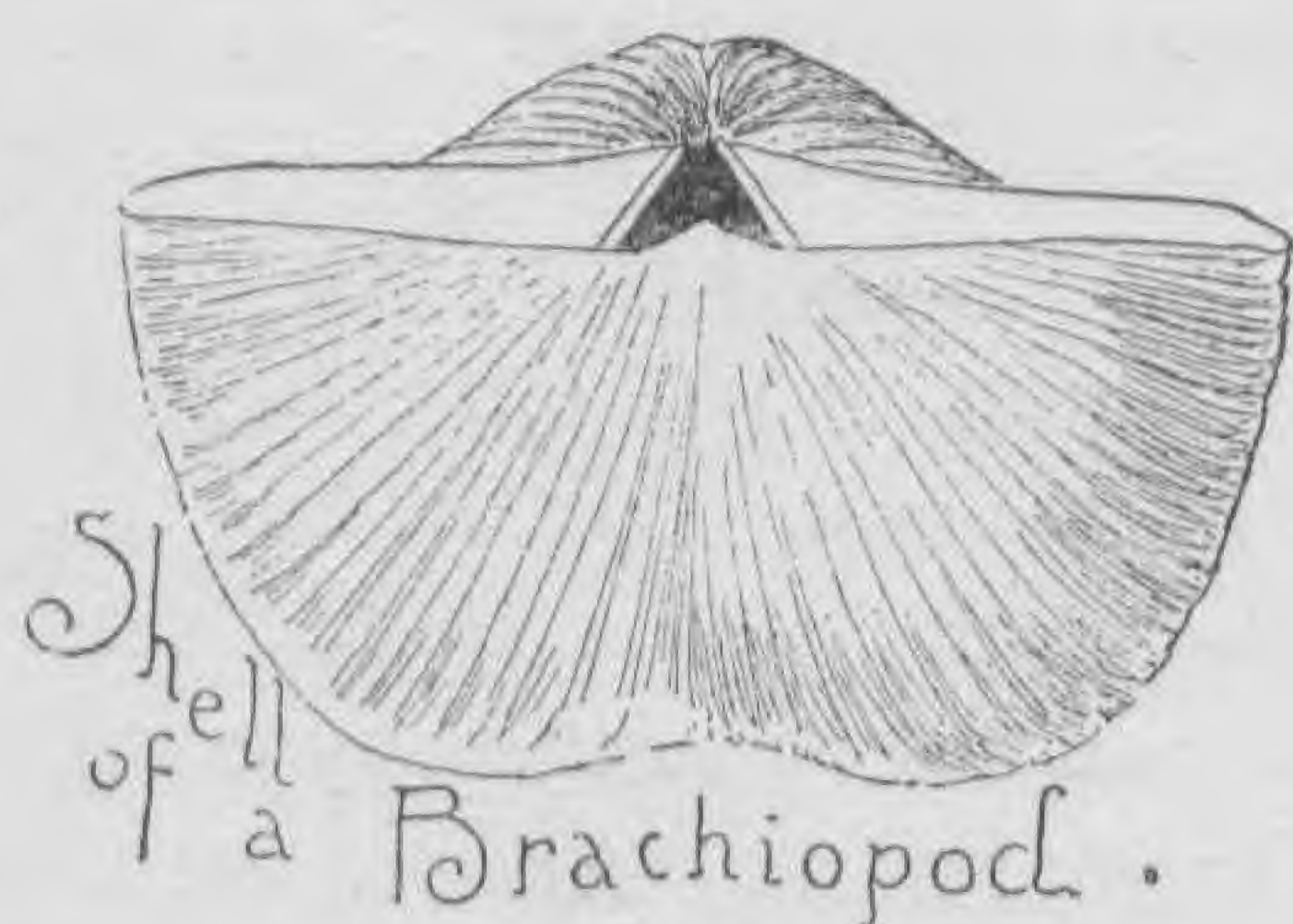
Cup corals were the internal skeletons of single animals or polyps, but there were also in the Silurian seas many kinds of compound corals, where the mass of coral was not the



Favosites
Niagarensis

stony part of one animal but of a great colony of many little animals. Of these compound corals far the most common are the Favosites or honeycomb corals, so called because they

look something like a honeycomb. "Petrified wasps' nests," they are often called by those who do not understand them. The mass is made up of several-sided tubes massed closely together side by side, so that they do look like a wasp's comb. Unlike honeycomb, however, the cells are cut across by thin partitions or floors. In life each cell was crowned and filled with a little animal, with its little fringe of delicate tentacles surrounding the mouth very much as in the much larger animal of the cup corals. The chain corals are the prettiest of Silurian corals. The coral consists of a mass of rounded tubes set in lines so that an end view of these lines of tube suggests a chain and gives the name to the form. Of course in life the whole



mass was covered with flesh and each tube was covered with its feathery circle of tentacles.

Not so brilliant in color but more beautiful in form and more complex in structure was a group of animals called crinoids. They evidently enjoyed quiet pools or sheltered bays of not very shallow water. In such places they grew in such numbers as to form masses or tangles. The whole group is now almost extinct. They have very little animal matter or flesh, being almost entirely composed of stony rings or joints and plates.

A crinoid consisted of a stem, attached to sea bottom, upon which was borne a body made up of plates neatly jointed together. From this body were given off five or ten arms made, as was also the stem itself, of neat little flat, round discs of lime neatly laid one on another and held together by a very little animal matter. The five or ten arms in some species each divided into two, and these into two each, and so on until there was a perfect network of delicate feathery arms each made up of little stony bits.

In one species that lived much later than the

Silurian, Buckland says there were one hundred and fifty thousand of these little stony joints and three hundred thousand little muscle fibres. On the upper surface of each arm was a narrow channel or groove supplied with delicate threads which kept up a current of water in this channel toward the base of the arms. Finally the grooves from all the arms came together at the mouth, which may be visible or may be covered up and out of sight. This whole apparatus of arm grooves is intended to carry in a constant stream of water into the mouth, and in this water is contained the food of the crinoid, small animals, invisible to the eye. After death a crinoid's stem and arms would be very easily dashed to pieces by the waves and only the separated little round joints would be left. The body, made up of stouter and larger pieces more firmly fitted together, might remain unbroken. Occasionally in very quiet water, where the sediment deposited in it is very fine, the whole crinoid may be imbedded and preserved in all its beauty, every joint of the stem in place, the beautifully fitted plates of the body unmoved and even the most delicate portion of the smallest arms so situated that we can study its relations to the rest as well as if the creature were alive before us.

We can only look at one more kind of Silurian sea animal. Almost everywhere on that sea bottom we would find masses of bivalve shells — brachiopods. Some naturalists think brachiopods are mollusks like the oyster or snail; others think it is a worm with the curious unworm-like character of a two-valved shell of limestone. Brachiopods are certainly much unlike oysters both within and without. Inside the most curious point to notice is that the animal has a pair of coiled, delicately fringed arms. These may be loosely coiled or they may rest upon stony loops of support; they may be movable or they may be unmovable according to the kind of brachiopod. It is these queer "arms" that give the name which means "arm-foot." Don't think, though, that they are feet or have anything to do with walking. They help the creature in breathing. Most brachiopods did not move from place to place, but were fixed in one spot — some by one valve growing firmly to some stone or to another

shell; others by a fleshy stalk, which passed out through a hole in one of the valves. Externally the brachiopod shell differs in shape from that of a clam or oyster — each valve can be divided into similar halves by a straight line. Try to do this with an oyster or clam shell and you will see what I mean. Many hundreds of kinds of brachiopods lived in the Silurian Seas — more than have lived at any time since. To-day they are a group that is almost extinct.

This is the oldest life we shall study. It is not the oldest known. But remember there was an age in the world's history — the Silurian — when life was almost confined to the sea, it was invertebrate — yet it was abundant and beauti-

ful. Very old-fashioned, too, was that life, Brachiopods, crinoids, cup-corals, trilobites, orthoceras — only a few out of the many. They must stand for all from this bit of an old ocean bed.

Our hill rambles must stop. We have learned two sets of lessons. First, what hills are, how made, and that the world has gone through many years of change and many kinds of action to be what it now is, and second, that the life of the world is now changing, has ever been changing since vegetable and animal first appeared, that one set of forms after another have appeared, culminated, dwindled, and died out.

Frederick Starr.

THE ARCHITECTURE OF THE MOSLEMS.

(Search-Questions in Mahometan History.)

221. What architectural feature of the religious buildings of the Moslems corresponds to the spire of Christendom, and what is its use?

222. What was the first important building erected in Jerusalem by the Moslems after their capture of it in 636?

223. What was the first religious building erected by the Mahometans?

224. What form of the arch is most common in Saracenic architecture?

225. What great specimen of Moslem architecture exists at Ispahan in Persia?

226. Mention a distinguishing feature of Persian Saracenic decoration.

227. What great monument of Saracenic art exists at Cordova?

228. Of what materials were the roofs of the Moorish building in Spain constructed?

229. What famous Saracenic tower exists at Seville?

230. What Moorish palace still stands in Seville?

231. When was the Alhambra begun and in what city is it situated?

232. What are the two great courts of the Alhambra called?

233. By whom was the more beautiful of these courts erected?

234. In which hall are the chiefs of a noted family said to have been beheaded?

235. What noted American writer lived for some time in the Alhambra?

236. What great Christian church in Constantinople became the model of nearly all Turkish mosques?

237. Name the most important mosque in Constantinople and state by whom it was erected.

238. How do the Turkish minarets differ noticeably from those of other Mahometan countries?

239. What is the great distinguishing architectural feature of the Moslem mosque?

240. What emblem crowns all Turkish mosques?

ANSWERS TO SEPTEMBER SEARCH-QUESTIONS.

181. That of the Almohades who subdued Morocco in 1145 and soon after united the whole of Southern Spain under their rule.

182. The battle of Alarcos.

183. The battle of Las Vavas.

184. About 1235 when the Almohades were driven from Spain by the Moorish chiefs of Andalusia.

185. In 1238.

186. Ibu-el-Ahmar, an Arab.

187. It became tributary to Castile.

188. About two hundred and fifty years.

189. The marriage of Ferdinand II. of Aragon and Isabella of Castile in 1469.

190. Muley Ali commonly known by the surname Abu-l-Hasan. Spanish writers change this into Alboacen and English historians often refer to him as Aben Hasan.

191. Upon the Moorish side.

192. The capture of the Christian city of Zahara.

193. Abu-Abdallah commonly called Boabdil.

194. By the persuasions of Ferdinand and Isabella Boabdil was induced to become their ally and suffered to return to Granada where Abu-l-Hasan, his father, held the Alhambra fortress.

195. A Cordovan family who supported Abu-l-Hasan in opposition to the Zegrís who espoused the cause of Boabdil and his mother Ayesha.

196. The feud between the partisans of Boabdil and those of Ez-Zorghal his uncle who succeeded to the throne on the death of Abu-l-Hasan.

197. In November, 1491.

198. In 1501, the Moors or Moriscoes as they were now called, living in the mountain district of the Alpuxarras, rebelled and gained a victory over their opponents, but were soon suppressed. The second revolt broke out in the same region and was not suppressed for two years.

199. Aben Abó who led the second revolt of the Moriscoes. He was assassinated by the Spaniards and his head exhibited over the Gate of the Shambles in Granada for thirty years.

200. The final expulsion of the Moors from Spain was accomplished by Philip III. in 1610; in the year of the Hegira, 1017.

Oscar Fay Adams.

